

# Chemical Week

March 5, 1955

Price 35 cents



**Spread of 'right-to-work' laws** will affect union activity, wages, even your plant location . . p. 18

► **Miller and Taube** apply classical logic, evolve novel, simple literature index system . . . . . p. 40

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**Rare earths no rarity;** tonnage output sparks use in steel, glass, carbon arcs . . . . . p. 66



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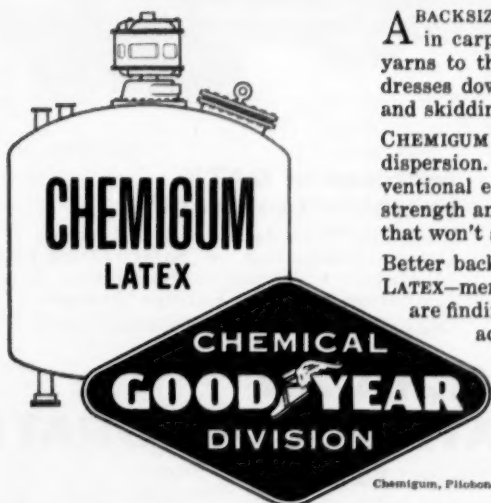
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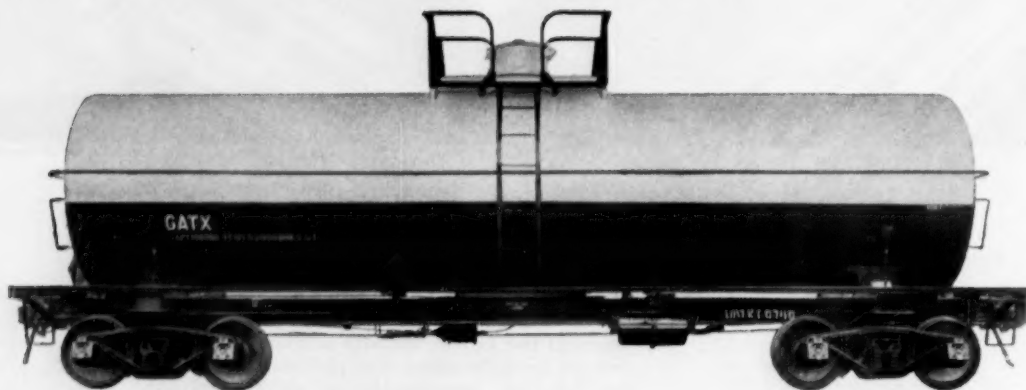
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# Chemical Week

Volume 76

MARCH 5, 1955

Number 10

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Chemical Week (including Chemical Specialties and Chemical Industries) is published by McGraw-Hill Publishing Company, Inc. James H. McGraw (1860-1948), founder, Executive, Editorial and Advertising Offices; McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y. Publication Office: 1309 Noble St., Philadelphia 23, Pa. Donald C. McGraw, President; Willard Chevalier, Executive Vice-President; Joseph A. Gerardi, Vice-President and Treasurer; John J. Cosko, Secretary; Paul Montgomery, Senior Vice-President, Publications Division; Ralph B. Smith, Vice-President and Editorial Director; Nelson Bond, Vice-President and Director of Advertising; J. E. Blackburn, Jr., Vice-President and Director of Circulation.  
Subscriptions to Chemical Week are solicited from management men in the chemical process industries. Position and company connection must be indicated on subscription order. Address all subscription communications to Chemical Week Subscription Service, 330 W. 42nd St., New York 36, N. Y. or 1309 Noble St., Philadelphia 23, Pa. Allow one month for change of address.  
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## Career for Individuals

TO THE EDITOR: In "Upgrading the Human Element" (*Feb. 19, p. 62*) Walter D. Woodward, M.D., makes some cogent points on human factors in research administration. He also holds forth a bleak future for industrial men who choose to remain laboratory scientists.

Dr. Woodward's theme is organized group discussion as an aid in developing administrative leadership in research and development personnel. Among the advantages of the conference technique he cites the instillation of "the elements of good leadership in the young researcher, the fellow who is a little uncomfortable with people and thinks he would like to spend the rest of his professional life at the bench."

He goes on, "Unless he's the rare exception, he ultimately finds it's painful watching his juniors get ahead while he remains a laboratory chemist. This man can't be ignored, or he becomes a serious focus of discontent. And in the overwhelming majority of cases, he either moves up or gets out. By receiving training in leadership, the normally shy researcher is prepared for administrative responsibilities. Such a man's value to his company increases a hundredfold."

These remarks touch upon a serious problem—that of making it possible for top-notch men who choose industrial laboratory science to remain at the bench and be happy there. Surely having them weaned from their folly by a psychiatrist is no answer . . .

More hopeful, and more profitable, too, would seem the following views expressed in a book, "Responsibilities of Business Leadership," published recently by the General Electric Co.

Says management consultant Peter F. Drucker: "The professional employee represents the scarcest and most valuable of all resources: the educated, imaginative, creative human being. . . . It is the manager's ultimate responsibility to make sure that a career as an individual professional contributor be as rewarding and as honored as a career as a manager, and that a man's contribution as an individual professional be as seriously appraised and as fairly rewarded as any other contribution in the enterprise."

Says GE President Ralph J. Cordiner: "We must see that the outstanding individual performer receives the kind of reward in dignity, appreciation, and compensation that will give him a satisfactory and creative career in his field of competence. . . ."

PHILIP D. GEORGE  
Schenectady, N.Y.

## Niagara Cyanuric

TO THE EDITOR: Your news article "Broad-Spectrum Rewards" (*Feb. 5*) mentions American Cyanamid and Degussa as the major world producers of cyanuric chloride. May I point out that you have omitted our company—a major producer and the only one during the years before Cyanamid's new plant came into production.

Our company, associated with General Abrasive Company, Inc. . . . was incorporated on Jan. 1, 1951, and began production of cyanuric chloride shortly thereafter. . . . Our plant has sufficient capacity to supply the U.S. market and has, indeed, supplied a major part of it for several years. . . .

Mr. Wolf's dream of 75¢ cyanuric chloride will undoubtedly be realized when a really large volume use develops. Production capacity will be no problem. . . .

W. A. MOHUN  
Director of Research  
Nilok Chemicals, Inc., and  
General Abrasive Company, Inc.  
Niagara Falls, N.Y.

## Purport Lost?

TO THE EDITOR: Your gem "How to Add a Buying Plus" (*Feb. 5, p. 81*) must have been written by an engineer and the session described (Chemical and Allied Products Buyers) must have been planned for a course in college purchasing. I have been associated with the purchasing departments of five of the "top 100" in the past 12 years, and have seen nothing *but* the use of "cold analytical figures" and the use of plenty of so-called "market research." The term "market research" has been so ballyhooed by the glorified sandwich men that the purport has been lost in the clouds . . .

I concur that it is way past time for management in general to open its eyes and do a little market research of

its own—it will verify the fact quickly that the purchasing agent should have been an integral part of so-called management long ago . . .

R. S. BROOKS  
Assistant Purchasing Agent  
Naugatuck Chemical Division  
U. S. Rubber Co.  
Joliet, Ill.

Said CW, *The meetings hit hard on two themes: (1) Buyers can add to their effectiveness through use of market research; (2) chemical purchasers, by accepting the increasing number of business decisions thrust upon them, are in a position to rise more frequently to upper management councils than was possible in the past.*—ED.

## Classical not Ordinary

TO THE EDITOR: Your statement (*Feb. 5, p. 64*) that "ordinarily" boron hydrides are made by the action of acid on magnesium boride is in sharp contrast to the usual care and reliability of CW. It is out of date. That is the classical method but it is by no means the modern method.

There are at least eight U.S. patents directed to improved methods of preparing boron hydrides, and reference may be made likewise to the series of papers by Schlesinger and his co-workers (*p. 186, Vol. 75, JACS*) . . .

FULTON B. FLICK  
Brown, Critchlow, Flick & Peckham  
Pittsburgh, Pa.

*Correct. We erred in saying "ordinarily" rather than "classically."*—ED.

## DATES AHEAD . . .

Commercial Chemical Development Assn., "Public Relations in New Product Development" meeting, Statler Hotel, New York, March 17.

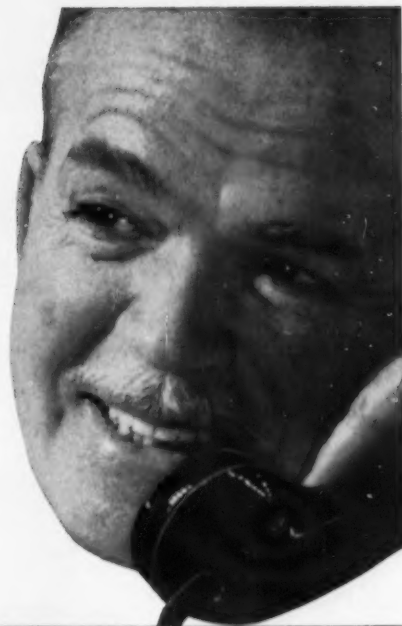
Fourth Annual Water Symposium, Louisiana State University, Baton Rouge, March 22-23.

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

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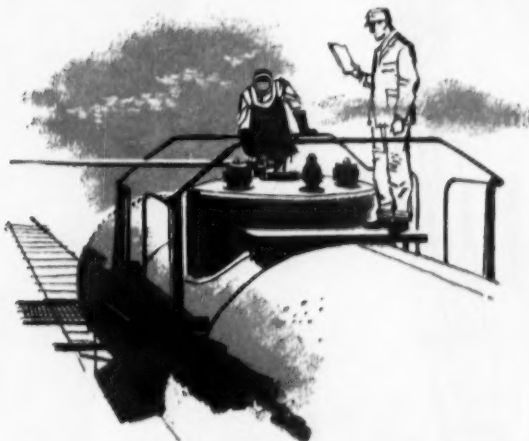
"When we need phenol,  
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naturally"

... And there's good reason for this attitude among the many users of Dow phenol. Because Dow customers consider the prompt delivery of that tank car only a small part of the transaction.



Before the actual product ever left the Dow Plant, they may have received Dow technical assistance on the best use of phenol in their production—may have even developed their final product with the help of Dow technical literature and staff assistance.

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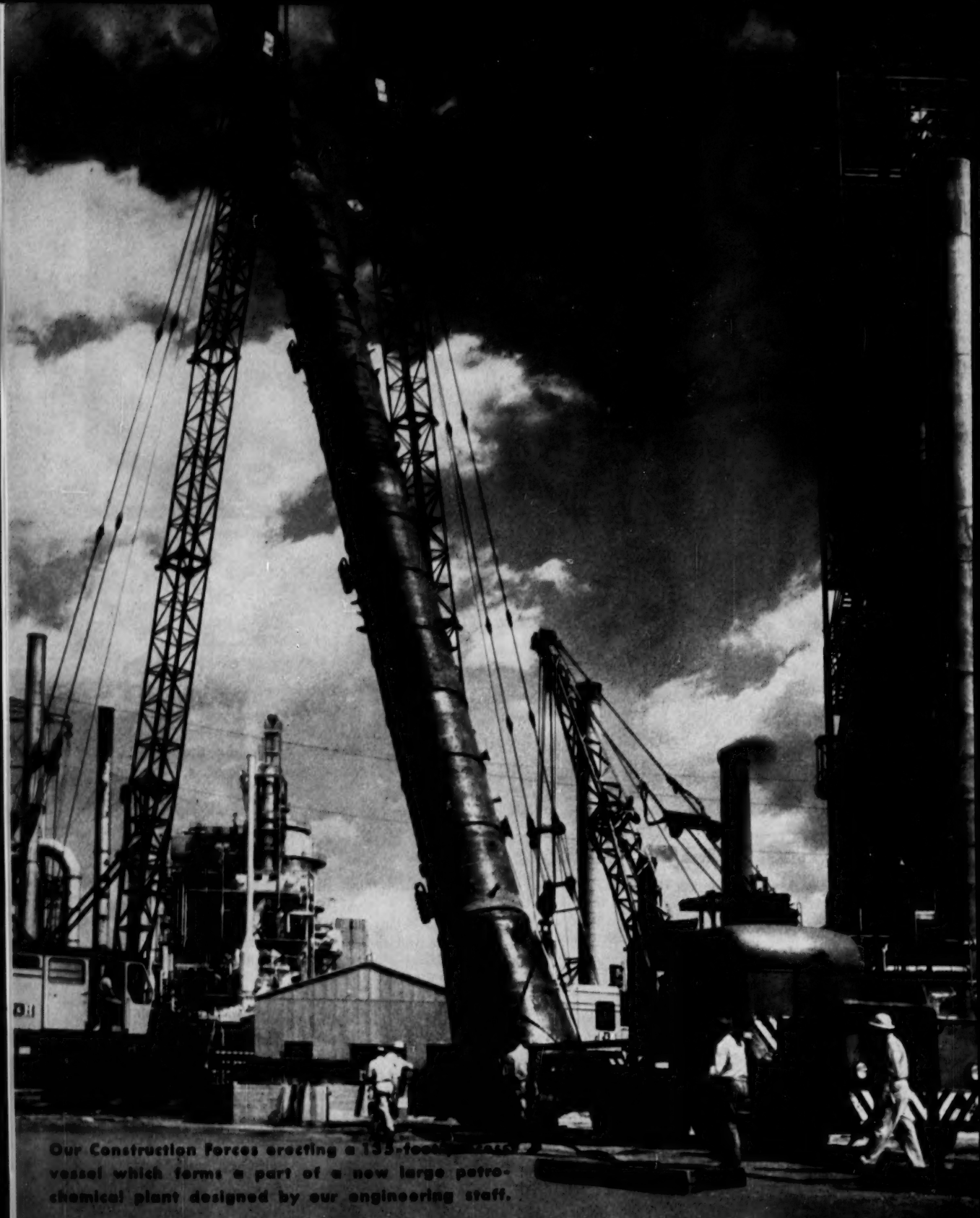
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## NEWSLETTER

Add one more state—West Virginia—to the 11 others considering “right-to-work” legislation (*see p. 18*). Describing his bill as a move to attract industry to the state, legislator John Lile says, “In any number of cases, we have seen industry move right up to the state line in Virginia, which has a right-to-work law, but there it stops . . . the simple truth is that industry is afraid to cross the line; it is afraid of West Virginia’s labor situation.” But the bill is conceded little chance of passage.

•

Action against East German potash is ruled out by a 3-3 split of the U. S. Tariff Commission. In the first antidumping case handled under the procedure set up in last year’s customs simplification act, the commission tied, thus made no finding that domestic industry was being injured by importation, at “dump” prices, of Soviet material. Treasury Dept. had earlier called it dumping, and had the Tariff Commission agreed, a special levy would have been automatically assessed to bring prices up to nondump levels.

•

The Food & Drug Administration is under fire by the Hoover Commission task force studying medical services. It urges that FDA give up certification of antibiotics and coal-tar colors because industry had established an “extraordinary record of quality” for the materials. It also criticizes FDA’s alleged tendency to use “punitive rather than educational methods” of food and drug law enforcement.

But it recommends that regulation of pesticides—now split between FDA and the Dept. of Agriculture—be centered in FDA.

•

The final chapter on rubber starts next week, when both Senate and House committees start hearings on the rubber disposal commission’s sale package. The production and stabilization subgroup of the Senate Banking Committee, under Delaware’s Allen Frear, starts March 8; the House Armed Services Committee, under Georgia’s Carl Vinson, March 10.

One piece of unfinished business to be taken up by the latter body: a bill by Rep. Albert Thomas (D. Tex.) authorizing the government to reopen bids, allowing the commission 30 days to accept bids and 60 days more to negotiate. Reason for the bill is that the commission turned down bids on the plant at Baytown because they were too low.

•

Study of Hawaii’s titanium ore deposits, to determine their commercial potential, has been recommended by the territory’s government. Discovery of large ore bodies was revealed in 1953, and this month a U. S. agency recommended an inquiry to see if they are of sufficient quality for the national stock pile. Now Hawaii’s Industrial Research Advisory Council will prepare specifications for a comprehensive report; these will be submitted to U. S. research agencies for cost estimates and possible award of a research contract.

•

Add another potash producer. Freeport Sulphur and Pittsburgh Consolidation Coal have jointly formed National Potash Co. to work deposits near Carlsbad, N. M. The project will cost an estimated \$19 million, of which \$12.5 million will be loaned by an insurance company and the

balance will be supplied equally by the parent firms. Capacity: 250,000 tons/year of oxide. Production target date: 1957.

•

Substituted pyrazines and piperazines are in the news. Wyandotte Chemicals will shortly distribute research quantities of five new products of these types, produced by new synthetic methods that can, says the firm, be applied to large-scale output. Largely as a result of high cost, cyclic amines of this type have heretofore not been available in large quantities.

Potential uses of these chemicals except as pharmaceutical intermediates—sulfa drugs, etc.—are largely conjectural; but Wyandotte is hopeful, of course, that availability will uncover some.

•

Carthage Hydrocol is no more. Name of the company, now a Stanolind Oil and Gas subsidiary, has been changed to Hidalgo Chemical Co. Only the name is changed; the corporate relationships remain the same.

Hidalgo's Brownsville, Tex., plant is now undergoing rehabilitation. It will be operated by Stanolind, under contract with Hidalgo, to produce acids, alcohols, aldehydes and ketones in the one- to five-carbon-atom range. These, together with the chemicals Stanolind produces at its own adjacent chemical recovery plant, will be marketed under the Hidalgo name through R. W. Greeff (*CW*, Jan. 29, p. 44).

•

A Midwest phosphate producer will shortly try to turn a bane into a blessing: it will start up a plant within the next month or two to produce hydrofluoric acid from the fluoride content of its phosphate rock. It wants to complete a shakedown run before publicizing its project or product, however.

•

One Texas legislator wants the whole country to pay for the state's highways, and the process industries will also suffer if his bill should become law. State Rep. Jerry Sadler would replace the state's 4¢/gal. retail gasoline tax with a 1¢ refining tax. He says that the current levy is "unfair and discriminatory to the citizens of Texas," that 60% of the processing tax would be paid by out-of-state gasoline users, and that passage of his proposal would "satisfy the governor and we could all go home."

Meanwhile, the state senate passed a resolution asking the U. S. Congress to enact a federal law prohibiting the Federal Power Commission from setting prices on natural gas, which power it now has under the Supreme Court's ruling in the precedent-setting Phillips case.

•

Three to ten times as strong as ordinary paper are synthetic papers made by Du Pont from nylon, Dacron and Orlon fibers. Like their constituent fibers, the papers are resistant to chemicals, moulds, bacteria, and water absorption. Proposed uses: heavy-duty bags, filters, maps and tracing papers, chemical packaging.

Du Pont won't manufacture synthetic paper but will make its research results available to the paper industry.

. . . The Editors

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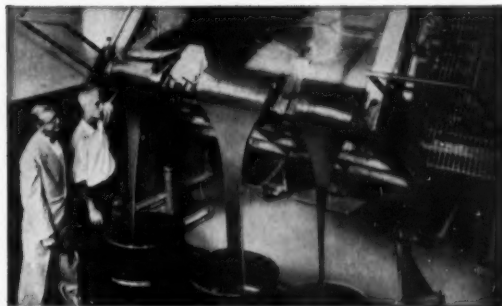
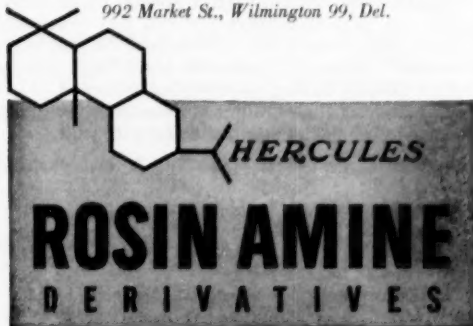
The known reactions and properties of Hercules Rosin Amine D and its derivatives may suggest potential uses of importance to you. Write for further information. You will be interested, too, in the water-soluble and acid-soluble types now available.

*Naval Stores Department*

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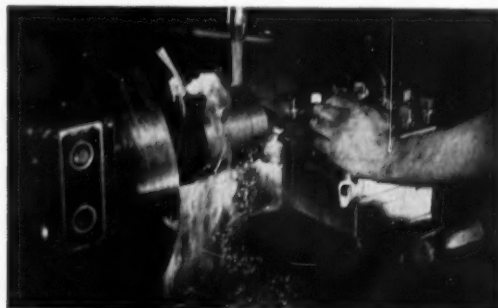
**PIGMENT FLUSHING**—Rosin Amine D is useful as a reagent for the production of flushed colors. Its use for this purpose is compatible with standard flushing practices.



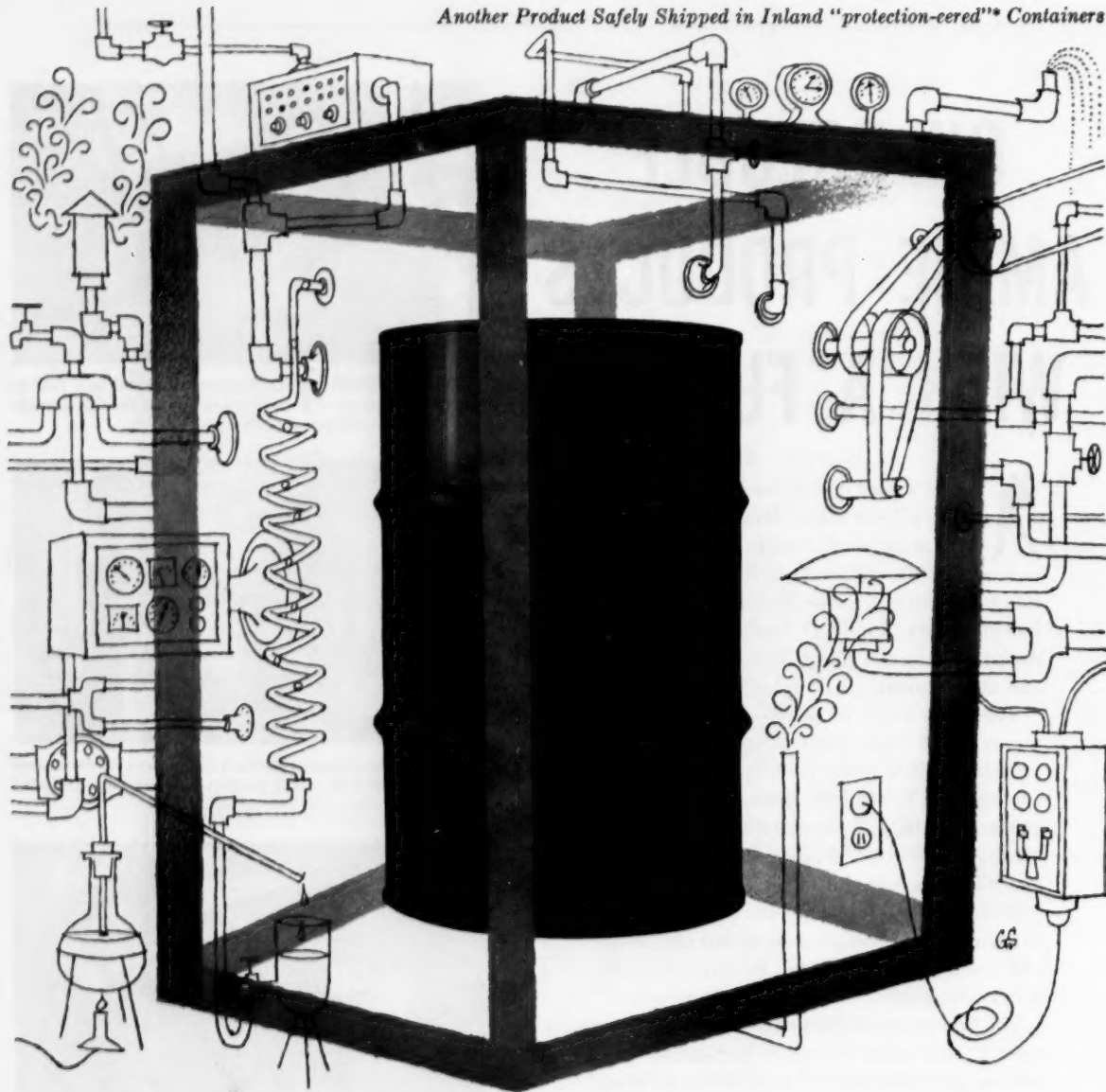
**FUNGICIDE**—the value of Rosin Amine D and its derivatives as a preservative for many products has been demonstrated in rope, and other cellulosic materials.



**WETTING AGENT**—In ceramic and printing inks, as well as asphalt compounds, the surface activity of the Rosin Amine D family leads to better products.



**CORROSION INHIBITOR**—Rosin Amine D derivatives have demonstrated their value in soluble cutting oils, and other hydrocarbon systems.



## INLAND drums pass the **"HOT BOX"** test!

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## BUSINESS &amp; INDUSTRY. . . .



SARGENT: Taking a long step toward putting Diamond . . .

## Closer to Consumers

Diamond Alkali Co.—long-time producer of basic inorganic chemicals—took a long step closer to the consumer last week through purchase of Virginia-Carolina Chemical Corp.'s Black Leaf agricultural and pest control chemicals division. Under terms of the agreement, Virginia-Carolina maintains minority interest in Diamond Black Leaf Co. for the next five years; Diamond takes over management as of March 1.

In the Black Leaf line of products are 200 different sprays, dusts and herbicides; plants are at Richmond, Louisville, Montgomery, and Waco, Tex.

From Diamond's organizational standpoint, the move is significant. Up until 1946, Diamond was virtually wedded to the soda ash market; soda ash and related products accounted for more than 50% of total sales. Then the product mix started to change (CW, Aug. 18, '51, p. 13; Jan. 9, '54, p. 14). The company started to stress expansion in chlorine, then used increased capacity as a springboard to enter organic production (e.g., insecticides, herbicides, perchlorethy-

lene, and polyvinyl chloride). Insecticide operations were broadened through acquisition of Kolker Chemical; organic lines were solidified through purchase of Belle Alkali. More recently: acquisition of a former government-owned 225-ton/day chlorine plant at Muscle Shoals, Ala. (run by Monsanto during the war), has boosted Diamond's chlorine output 30%. (In 1954, organics ranked as Diamond's second largest product group—20% of total sales; chlorine was in third place at 14%.)

A breakdown of 1954 sales figures indicates just how far the Diamond move toward the consumer has progressed. Currently, 85% of Diamond's sales are directly linked to consumer products; insecticides alone account for 8% of the company's total volume of business (as against only 3% in 1950).

Formation of Diamond Black Leaf Co. won't change Diamond's practice of selling chlorinated intermediates to other pesticide producers, President John Sargent points out. But it puts Diamond "out on the shelf" where it

can benefit from higher profit margins and the "identification values" of consumer products.

## Three-Ring Ruckus

In the four-way collision over tetracycline rights (CW, Jan. 22, p. 15), hostilities are now going on in three widely separated arenas along the Eastern Seaboard.

Down South at Atlanta, there's the infringement suit filed in federal court by Chas. Pfizer & Co. in defense of the patent (No. 2,699,054) it received Jan. 11 on manufacture, use and sale of tetracycline and its salts. At Washington, Bristol Laboratories is still trying to win a patent on its own tetracycline process. And in New York City, all three Pfizer opponents in this controversy—Bristol, Upjohn and Olin Mathieson's E. R. Squibb division—have now filed actions in federal court in an attempt to stymie Pfizer's litigation against them at Atlanta.

In these latest lawsuits, Bristol, Upjohn and Squibb admit that they're selling tetracycline made by Bristol. But they deny that there's any infringement in what they're doing; they're asking the court for judgment declaring that they're innocent. They also want the court to issue an injunction preventing Pfizer from bringing, prosecuting, or threatening to bring legal action charging such infringement. Further, they say that Pfizer should pay all court costs.

Pfizer's position: that the probable suit in Atlanta should have top priority, and that the filing of the suits in New York was merely an attempt to put Pfizer on the defensive.

Pfizer's move to institute suit in Atlanta could be interpreted as an attempt to get rapid adjudication of its rights against Bristol, Squibb and Upjohn. Final determination of the case would be delayed as long as three years if decided in New York . . . with one of the most crowded dockets in the country.

"And that," one observer notes, "might suit Pfizer's adversaries to a T."

**FEDERAL FLOORS UNDER CHEMICAL WAGES**

(Minimum wage rates in chemical industry, as determined by Secretary of Labor under Walsh-Healey Act for government contracts)

Segment of Industry	Current Hourly		Area Covered by Order
	Minimum	Date Set	
Cosmetics	\$0.85	2/17/52	All states and Dist. of Columbia
Drugs and medicines	0.93	2/17/52	" " " " " "
Explosives and fireworks			
Fireworks	0.75	1/25/50	" " " " " "
Explosives	1.20	4/20/52	" " " " " "
Fertilizers	0.75	1/25/50	" " " " " "
Industrial chemicals			
Industrial and refined basic chemicals	0.95	1/23/51	Ala., Ark., Fla., Ga., Md., Miss., N.C., S.C., Tenn., Va. and D.C.
Same	1.15	1/23/51	All remaining states
Cleaning and polishing agents, insecticides, miscellaneous chemicals	0.85	1/23/51	All states and D.C.
Bone black, carbon black, and lamp black	1.40	1/23/51	All states and D.C.
Paints and varnishes	0.80	2/17/52	Ala., Ark., Fla., Ga., La., Miss., N.C., Okla., S.C., Tenn., Tex. and Va.
Same	1.05	2/17/52	All remaining states and D.C.
Photographic supplies	0.75	1/25/50	All states and D.C.
Soaps and detergents	0.95	2/25/50	" " " "

## Federal Winch to Hoist Chemical Wages

Wages in the chemical industry are going up—by government edict. No matter how well chemical union negotiators fare at the bargaining table this year, there's sure to be a pay hike in the lower-scaled jobs.

That's because of two moves currently being pushed by Labor Secretary James Mitchell. One is the Eisenhower Administration's program for a boost in the current 75¢/hour federal minimum wage; the other is the coming review of minimum wages set by Mitchell under terms of the Walsh-Healey Act (CW, Feb. 5, p. 16).

The chemical industry will be among those most sharply affected by these actions.

**Low Rates to Be Reviewed:** Current levels of minimum wages in various divisions of the chemical industry are shown in table (above). The minimum rates are those now

being paid by employers holding at least \$10,000 in contracts with the government.

Next week, Mitchell opens hearings at the Labor Dept. to consider a raise in the 75¢ minimum for the photographic supplies division. This is one of a series of periodic reviews of past minimums by the department's Walsh-Healey Division, with an eye to bringing them up to a "realistic" level.

Mitchell, himself, initiated the hearing. But, additionally, there are appeals from four labor unions in the industry to raise the basic minimum in the photographic supplies industry. (Walsh-Healey hearings are called either at the secretary's initiative or through request from industry or labor).

**Automatic Booster:** But, before a new W-H determination is made for this segment of the chemical industry,

there's a good chance that the lowest scales of all segments may be raised. It will come when Congress hikes the over-all federal minimum wage, and then all Walsh-Healey minimum rates below the new federal level will automatically move up.

It's almost sure-fire that Congress will okay a higher minimum, and there may be enough support to put through a \$1 minimum—to be effective in 1956.

When that happens, Mitchell is expected to issue a blanket order raising W-H minimums to the higher federal level although this is a pro forma action. Most firms are already affected by the over-all figure, since they come under the interstate commerce provision of the federal wage-hour law.

**Cutting Regional Spread:** A geographical breakdown shows the new rate would affect 1.1% of workers in the Far West; 2.3% in the Middle

West; 4.1% in the Northeast and 20.2% in the South.

The latter figure pinpoints the area where the opposition to the new minimum lies. Southern congressmen and their industrial constituents will fight hard to block the move to a higher minimum, but support for the program will come from the other three areas.

In fact, the higher minimum will be a boost to the non-South areas which have been losing industries to the South in the recent trend for industry to take advantage of the lower pay scales in that area. This would be welcomed by labor unions, particularly those hurt by runaway plants.

Meanwhile, Mitchell is going ahead with a review of all Walsh-Healey figures. The photographic supplies industry is the first test, and he is currently planning reviews in batteries and other chemical divisions.

But for the industries now paying the 75¢ minimum, the issue is as good as settled. Congress will take care of that when it boosts the federal minimum.

## Speed-up on Clearance

The Defense Dept. has revamped its security clearance program for workers in chemical and other defense plants. Object: to cut down on the number of unnecessary suspensions and speed up the clearance of industrial workers whose jobs require access to highly classified government matter.

Under the new system, Washington will have direct control; plant security officers will make an initial check on employees, then refer cases that look risky to a "central screening board" that's being set up in the Pentagon. The board will make a further investigation to decide whether a suspension is justified.

If a suspended man wants to contest the decision, he will get a hearing before one of three regional hearing boards located in New York, Chicago and San Francisco. If this board makes a split decision—or if a "novel issue" is involved—the case goes to a new "central review board," also in the Pentagon, which has the final say.

The security clearance overhaul takes care of some labor union criticism of the old system. Still unanswered, however: criteria for declaring who is a security risk.



FLEMING: Refocusing attention on . . .

## Industrial Hot Spots

The work of a top-secret government board that looks for the country's industrial "Achilles' heels" is coming into the limelight this week in the wake of the Atomic Energy Commission's estimate on H-bomb fallout.

Known as the Industry Evaluation Board, the organization's appointed task is to spot essential chemicals (and other war materials) on which this nation might depend in time of war, and determine whether a single atom blast could knock out (or cripple) a critical portion of total U.S. chemical output.

Kurt Rossinger (who heads the board's permanent staff) cites this World War II example of the sort of thing IEB is pledged to avoid: while no single bomb blast or sabotage could have destroyed the U.S. synthetic rubber industry in 1941, there was—"eight or nine steps away"—concentration of over 90% of total U.S. capacity of a chemical essential to production of both GR-S and neoprene. Replacement of this single plant (if destroyed) could have delayed the whole synthetic rubber program by almost a year. Another product (needed in production of special-purpose rubber) was made entirely in a single plant; three more plants (which turned out another essential chemical) accounted for 35%, 33%, and 28% of over-all U.S. production, respectively.

Metallic sodium, on which many industries were dependent, was also

critical during World War II. And the facilities that produced it would have been particularly easy to sabotage.

**Still a Problem:** What's bothering government defense officials now is that the situation hasn't changed much today. At the end of 1944 there were 100 critical chemicals (that went directly or indirectly into military end products) in exactly the same vulnerable position. In many cases, 50% of the material was produced in a single plant; in others, an individual facility turned out the entire U. S. supply of one or more products—without which any war effort would stagger. Rossinger won't even hint at how many chemical commodities are now listed, but it's a fair bet that the number is no less than in 1944—and could easily be more extensive.

The day-to-day job of IEB is to check for items and plants that would be critical to the U.S. defense effort in case of enemy attack. When such a chemical or other material is found, information on it is passed to the various agencies that are involved in industrial defense. The Defense Dept., AEC and FBI, which are involved in physical protection of plants in the broadest sense, and civil defense officials—who plan defense activities in target areas (specifically Defense Mobilization Director Arthur Fleming)—receive IEB reports. To attempt reduction of single-plant vulnerability, copies go to officials in charge of stock-piling, granting tax write-offs or other aids to geographic dispersion, and to those who, in emergencies, would grant allocations or priorities. Other copies go to agencies involved in "industrial and counterindustrial intelligence." (One way for the U.S. to find what the Russian Achilles' heels are is to look at its own.)

In its chemical industry studies, the board relies in part on the chemical and rubber division of BDSA for technical help in flagging critical items.

Rossinger, asked last week if the government is remedying the situations his board turns up, replied: "I hope so . . . to some extent, yes. At least we've defined the problem."

Officials who get his reports, however, feel that their job may be easier in the future because of the awareness on the part of Congress and the public of the magnitude of the mobilization job.

## EXPANSION

**Potassium Sulfate:** International Minerals & Chemical Corp. is expanding its potassium sulfate producing facilities at Carlsbad, N.M., by 40,000 tons/year. Construction has started; the increased capacity (boosting IMC's output at Carlsbad to 150,000 tons/year) should be available during the coming fertilizer contract year.

**Automotive Chemicals:** The Grin Chemical Corp. (Pasadena, Calif.) will build a \$500,000 plant at Seattle, Wash., to produce automotive chemicals. No date of construction has yet been released.

**Sulfur:** Mexican Gulf Sulphur Co. has recently completed additions to its \$6-million sulfur-producing units at San Cristobal, Veracruz, that should enable

it to enter the export sulfur market by spring. Major docks and other facilities at Coatzacoalcas are now in operation; the company has increased (by 30%) the amount of superheated water that can be pumped daily into its sulfur-bearing wells.

**Year-and-a-Half Plans:** National Starch Products, Inc., plans a \$3.5-million capital expansion program stretching over the next 18 months. The program calls for increased capacity in all major phases of the company's business, with particular emphasis on expansion at Meredosia, Ill.

## COMPANIES. . . . .

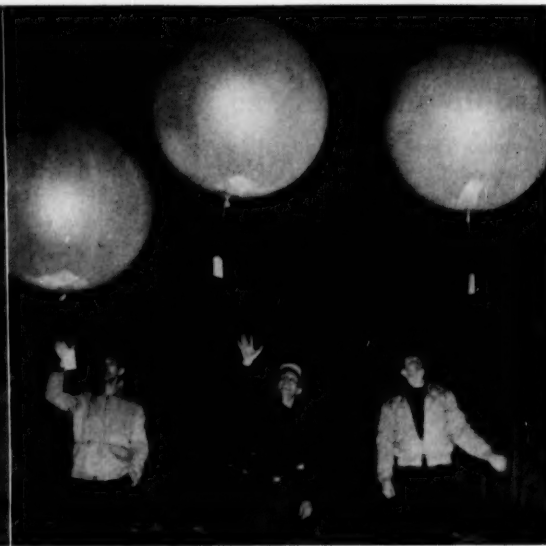
**Food Machinery & Chemical Corp.** (San Jose, Calif.) has offered to exchange one share of Food Machinery common stock for every 2.3 shares of

Chicksan Co. common. Chicksan (producer of specialized pressure-type swivel joints and wing-nut unions for the petroleum industry) has plants in Brea, Calif., and Houston, Tex., did a \$6.5-million business last year.

When negotiations are completed, the new operational setup will list Chicksan as an FM division.

**International Minerals & Chemical Corp.** has purchased all the assets of U.S. Mining Co., and Peerless Perlite Co. (Los Angeles). The properties will be operated by IMC's Industrial Minerals Division.

**Directors** of Pan American Sulphur Co. (Dallas) have approved a \$4.5-million increase in working capital. The funds will be used to establish a sulfur stock pile at the company's Jaltipan, Mex., plant.



## Massachusetts: Behind the Curtain for a Day

WESTERN MASSACHUSETTS was Iron Curtain country for a day last week when 100 free-floating, leaflet-carrying balloons were launched from Lockport, N.Y.

Released under conditions closely simulating those governing their release in western Europe, the balloons (produced by Dewey and Almy Chemical Co., division of W. R. Grace & Co.) are 7 ft. in diameter, carry 2 lbs. of leaflets apiece. Target area: Massachusetts and adjoining New York communities.

Designed to travel between 400-450 miles during the night (with prevailing winds of 50 miles/hour) the balloons climb rapidly to 36,000 ft., cruise at that level until sunrise. When the sun comes up, they ascend another 10,000 ft. to the burst level, scatter leaflets over a wide area.

Since April of last year, more than 30 million Crusade for Freedom leaflets have been dropped behind the Iron Curtain in this manner; current tests are aimed at testing the system's practicability.



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separating section of the Turba-Film evaporators. Heat transfer efficiency is excellent."

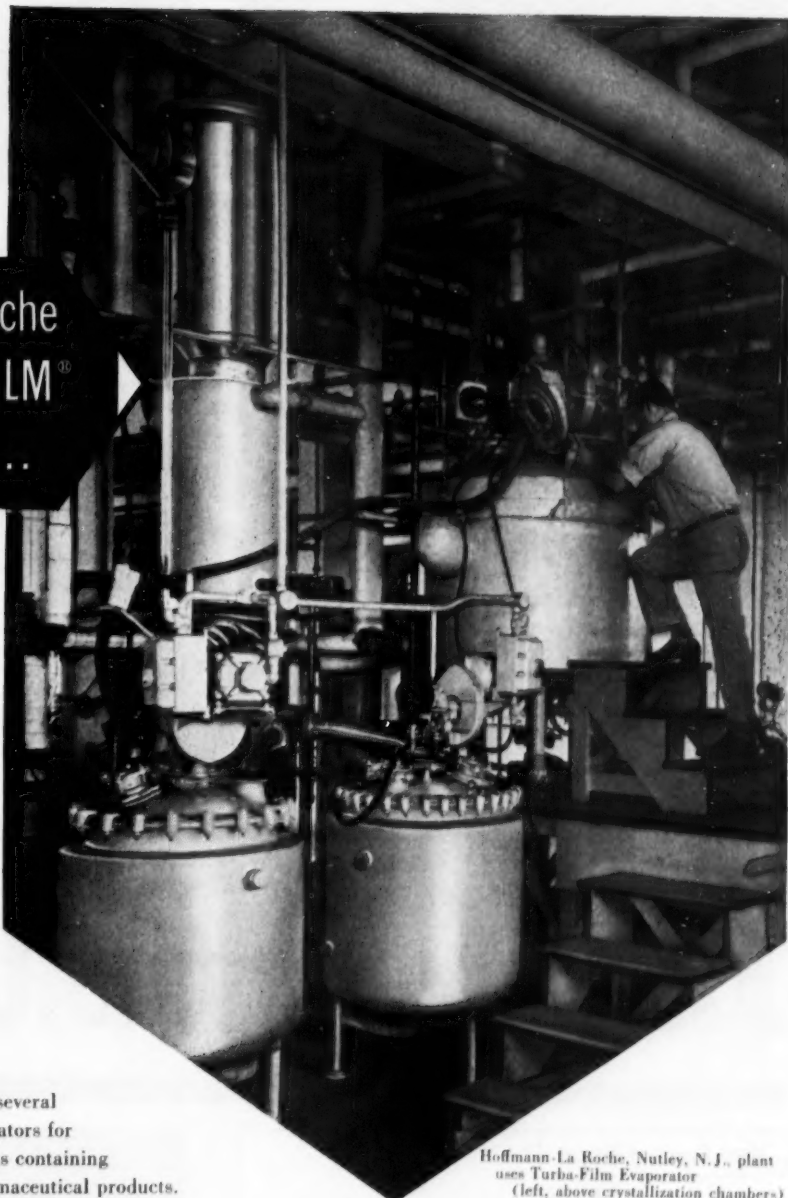
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Hoffmann-La Roche, Nutley, N. J., plant  
uses Turba-Film Evaporator  
(left, above crystallization chambers)  
in concentration of dissolved  
heat-sensitive products



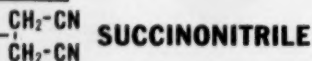
**CLEANING THE BRUSH** is easier today with paint-brush cleaners containing 5-10% AEROSOL® C-61 Surface Active Agent. This powerful cationic wetting agent gives added "bite" to volatile solvents in paint removers. Hard-caked brushes can be renovated by soaking in formulations containing C-61, then working solvent into bristles. Solvent-type or alkali paint removers with C-61 also are effective on glass, porcelain, metal and clothing. (No. 1)



**"MOST GLAMOROUS GARBAGE IN THE WORLD."** That's what residents said of a new garbage collection system tested by Hartford, Conn., and Cyanamid and Union Bag and Paper Corp. It eliminates garbage spillage, odors, return trips by the collector, banging of cans on sidewalk and truck. This "package system" uses a paper bag made with Cyanamid's Melostrength® Resin, which gives paper exceptional strength, wet or dry. (No. 2)

# Life...on the Chemical

## New Product News



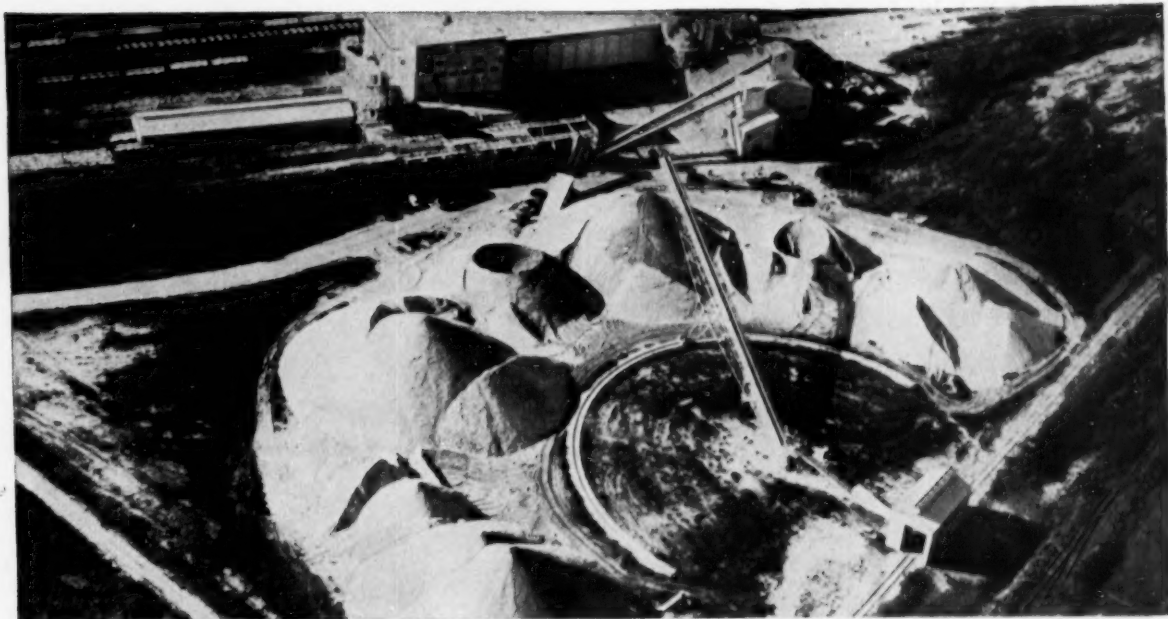
hydrolysis	Succinic Acid
hydration	Succinamide
alcoholysis	Succinic Esters
oxidation	Fumaronitrile
hydrogenation	Tetramethylene-diamine
hydrogenation	Pyrrolidine
hydration	Succinimide

This reactive aliphatic dinitrile now is available in semi-commercial quantities.

The reactions of succinonitrile may be utilized to prepare a variety of bi-functional chemicals which find application in the fields of resins, pharmaceuticals, surface active agents, and dye-stuffs. (No. 3)



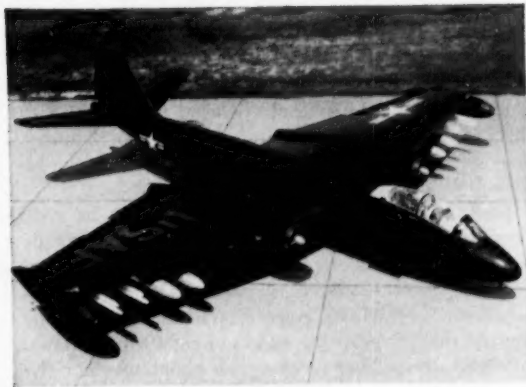
**VAT DYES GIVE LASTING LIFE** to colorful vacation fashions. Vat dyes are the best dyes for cotton and viscose rayon fabrics repeatedly exposed to sunlight, salt water, perspiration, rubbing and washing. These characteristics of vat dyes account for their popularity. Cyanamid, producer of Calco® Vat Dyes, works closely with textile finishers to help get top color performance. (No. 4)



**AROUND THE CLOCK SERVICE** to Cyanamid's customers is provided by modern phosphate mining, processing and handling facilities at Brewster, Florida. The rotary stacker-conveyor (above) helps expedite customers' shipping schedules of high-grade phosphate of the desired analysis for both agricultural and industrial uses. In this system, the boom stacker dumps rock at the rate of 800 long tons per hour from a height of 86½ feet.

Underneath the piles of rock is a kidney-shaped tunnel—approximately 1,025 feet long—which contains two 24" belt conveyors for carrying the phosphate rock to the Drying Plant in the background. There the rock is dried, further sized if customer requires, and loaded for shipment. Equally specialized equipment also speeds mining and processing, helping Cyanamid to give unusually flexible service to users of this basic chemical. (No. 5)

# Newsfront



**STARTER CLUTCH MECHANISMS** for the sleek new Martin B-57b bomber are getting a new carburizing treatment. Made by General Electric's Aircraft Accessory Turbine Dept. at Lynn, Mass., these parts are carburized in Cyanamid's new high-speed AEROCARB® S and R Carburizing Compounds. They give deep, rapid penetration, minimum distortion. (No. 6)



**SEND** more information on the following items mentioned in the March, 1955 issue of LIFE on the Chemical Newsfront: C.W.

No. 1, 2, 3, 4, 5, 6.

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MEANY AND HARTLEY (TOP), MITCHELL AND DILLARD (BELOW): As leading lights in fracas over 'right-to-work' laws against union-shop clauses, they sharpen focus on hotly contested national issue that chemical companies may discover is . . .

## Conflict of Consequence: Limit on Unions

Supercharged issue of the day in U.S. industrial relations: the so-called "right-to-work" laws, which are now in effect in 17 states and which may be enacted later this year in another 11 states (see map, p. 20).

This issue is a "war baby" that was born in Florida in 1944 when that state adopted the first law of this kind. It hurtled through adolescence in 1947—the year of the Taft-Hartley Act—when 11 states followed suit; and has now grown to the dimensions of a national problem that has caused a split within the President's cabinet. (Secretary of Labor James Mitchell, speaking at the recent CIO convention in Los Angeles,

attacked those laws as "undesirable and unnecessary limitations upon the freedom of working men and women"; Secretary of Commerce Sinclair Weeks reportedly supports the position of management groups that regard these laws as a wholesome assurance of "simple justice.")

To chemical process companies—constituting a growth industry that's still only about 50% unionized—the issue is highly consequential. How the issue is resolved is sure to affect:

- Industrial relations at each plant where a union now has or is seeking recognition.
- Extent and speed of union or-

ganizing at chemical plants.

- Wage rates throughout industry.
- Geographical patterns of industrial expansion.

**Future in Dispute:** Just as rival fortune-tellers may "read" totally different futures from the same set of tea leaves, so partisans in this issue are in vigorous disagreement as to the probable effects of right-to-work laws. They even argue about whether the laws are properly named; union leaders assert that "right-to-work" is a deliberately deceptive title, and President Dave Beck of the AFL Teamsters declares that the proper label for these laws is "right-to-exploit." The only



## FAMOUS LIGHTHOUSES OF AMERICA



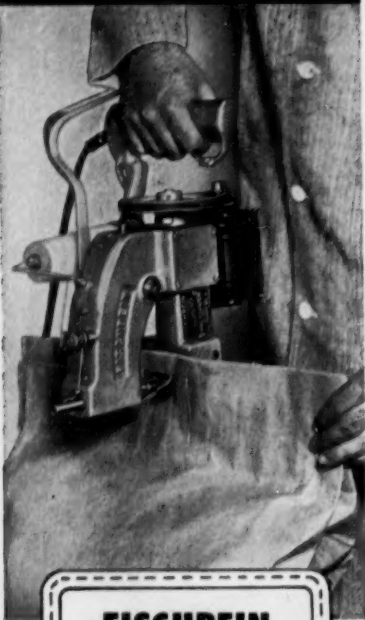
*MILE ROCK LIGHT guards the south side of the channel leading through the Golden Gate into San Francisco Bay, one of the world's finest land-locked harbors. The lighthouse, built on top of Mile Rock, is constructed of steel and concrete upon a massive monolithic concrete base 34 feet high. The top of the beacon is 90 feet above mean low water. On the opposite side of the Golden Gate is Point Bonita Light.*

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**BUSINESS & INDUSTRY**

thing the opposing factions agree on is that the laws forbid "compulsory unionism" as in the closed shop, union shop, and—as drawn up in some states — even maintenance-of-membership clauses.

Each side contends that its recipe is the right one for smoother labor-management relations. The question here probably boils down to whether it's better to work with a strong or weak union, because a union with 100% membership guaranteed is definitely stronger than if there's a non-union minority in the bargaining unit.

Union leaders feel that they'll be better able to organize Southern chemical plants if the right-to-work laws are repealed or invalidated by a federal law, such as the Taft-Hartley amendment bill recently introduced by Rep. James Roosevelt (D., Calif.) On the other hand, it's possible that Southern workers may be more willing to vote for a union if they know they won't have to keep up their individual memberships any longer than they choose to.

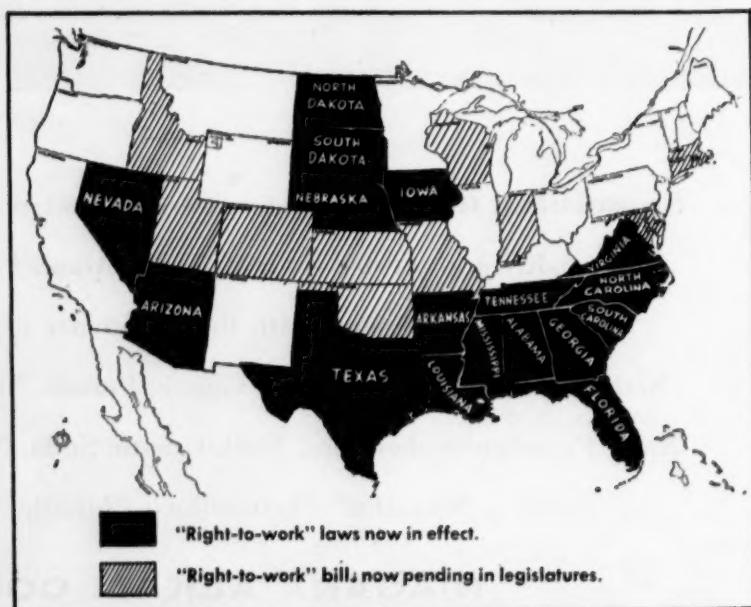
**Battle Lines Form:** Newly formed to support right-to-work laws is the National Right to Work Committee, Washington, D.C., which holds that "Americans must have the right, but not be compelled, to join labor unions." At its head are Edwin Dillard, president of Old Dominion Box Co. (Charlotte, N.C.), and Fred Hartley, Jr., former congressman from New

Jersey and co-author of the Taft-Hartley Act. Also on this side of the fray is the powerful Chamber of Commerce of the U.S., whose President Clem Johnston has declared that right-to-work laws are needed to keep labor unions from becoming "the happy hunting ground of leftists and labor racketeers."

Nearly all the opposition comes from labor union leaders—and officers of all three principal chemical unions are united on this issue. For example, President Elwood Swisher of United Gas, Coke & Chemical Workers (CIO) insists that a union shop contract is as fair as the principle that all citizens should pay taxes; he holds that when a union bargains for the workers, then those workers have an obligation to pay their share of the cost.

With the AFL and the CIO planning to merge under AFL President George Meany either late this year or early in '56, it's apparent that Meany will be head man in the drive to beat down the right-to-work laws. On the other side, Hartley looks like the chief ball carrier.

For the larger chemical companies, it'll be hard to put off any longer making a policy decision on this issue. Appeals for support will be coming from both sides on both state and national levels; and location of each new plant will be cited by partisans as a victory or defeat, depending on whether the plant goes into a state with or without this highly controversial law.



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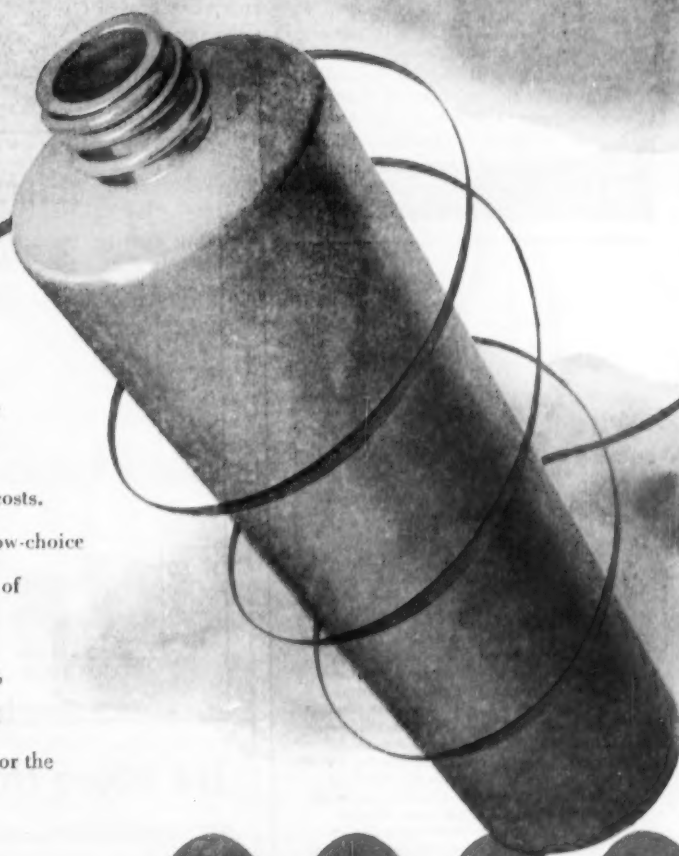
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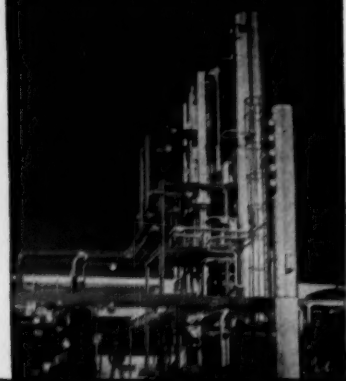
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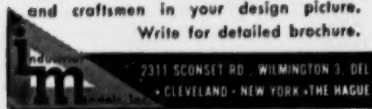
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## Twin-Pronged Planning

A \$40-million, two-plant fertilizer construction program for western Canada is nearing final stages this week. Ground-breaking ceremonies will take place early in the spring; both plants are expected in by mid-1956.

Separate Canadian-U.S. groups will own the two plants, but both plan to use natural gas as a basic raw material.

In Winnipeg, owner of the project (which will operate on gas from the proposed trans-Canada gas pipeline) is a newly incorporated company, Canadian Hydrocarbons, Ltd.—set up primarily as a financing company. This will be its first venture into chemical production, but strong support can be counted on from major stockholders—Winnipeg & Central Gas Co., and the Power Corp. of Canada.

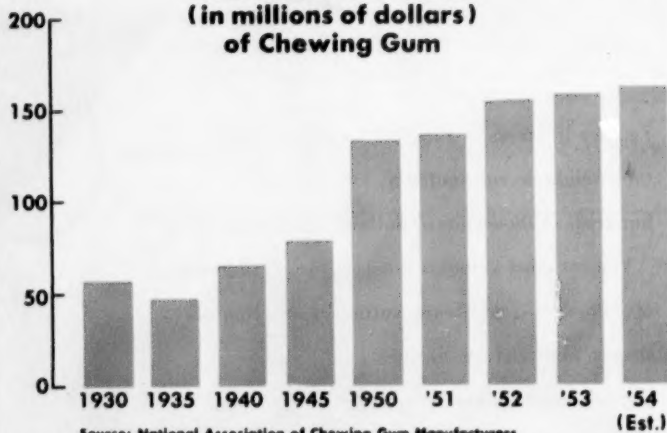
In southern Alberta, the project will operate on gas from the Etzikom field, in which New British Dominion Oil Co. holds majority stock ownership. It will be operated by Northwest Nitro-Chemicals—partly owned by Commercial Solvents Corp. (New York). Financing plans, company officials say, are already virtually completed; sale of debentures and common stock has yielded some 40% of the required \$20 million.

Bulk of the output of both plants will be marketed in the prairie area of Canada, but Canadian Hydrocarbons is aiming at Eastern markets, too. Unlike many heavy fertilizers, whose marketing scope is limited sharply by transportation charges, products from its Manitoba plant will be "designed to compete favorably in distant—even export—markets."

## IMPACT

### CHEWING UP CHEMICALS

**Manufacturers' Sales  
(in millions of dollars)  
of Chewing Gum**

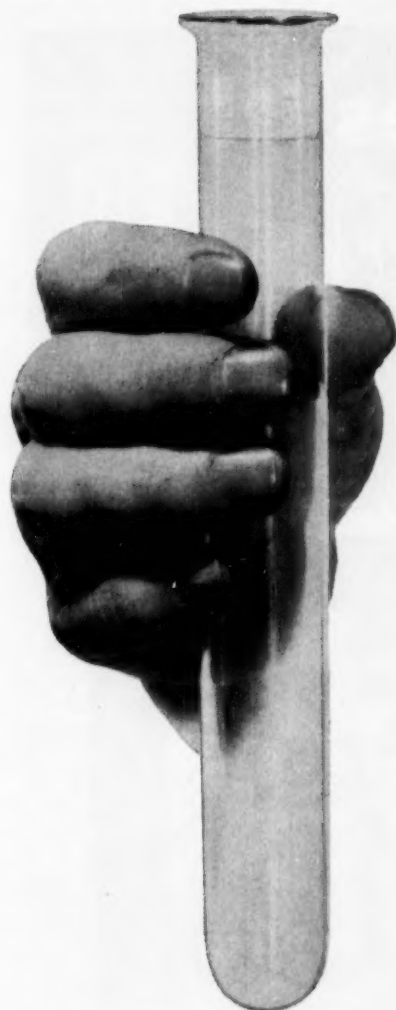


Source: National Association of Chewing Gum Manufacturers

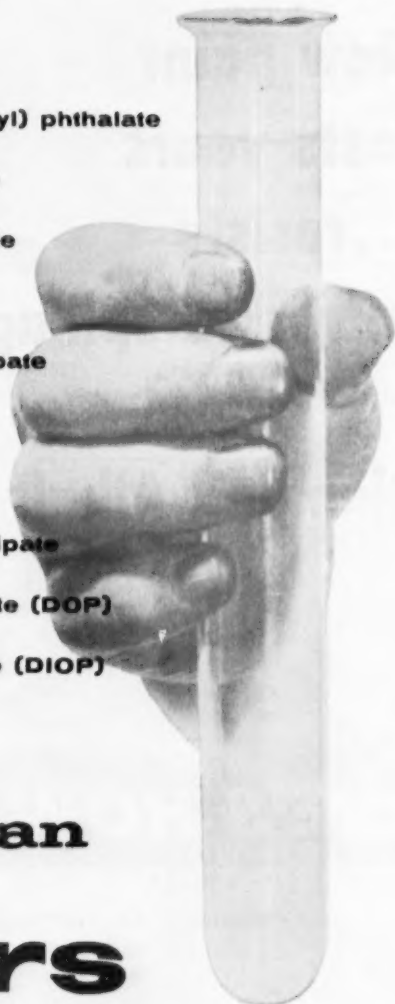
## It's More than Chic

MOST CHEMICAL workers aren't aware that gum-chewing habits have an impact on their own industry. Stick-gum chewers alone last year accounted for an estimated 2950 tons of polyvinyl acetate and 1450 tons of microcrystalline wax (both give the gum smoother texture), 8100 tons of natural gums (mostly chic), 750 tons of flavors (natural and synthetic), 14,700 tons of corn syrup, 43,400 tons of sugar. In addition: some 2200 tons of calcium carbonate were used in the gum base "for dental caries prevention."





dioctyl azelate  
dimethyl phthalate  
di-(methoxyethyl) phthalate  
di-isobutyl phthalate  
diethyl phthalate  
dibutyl phthalate  
di-isobutyl adipate  
triacetin  
tributyrin  
di-(2-ethylhexyl) adipate  
dioctyl phthalate (DOP)  
di-isooctyl phthalate (DIOP)



# Eastman plasticizers

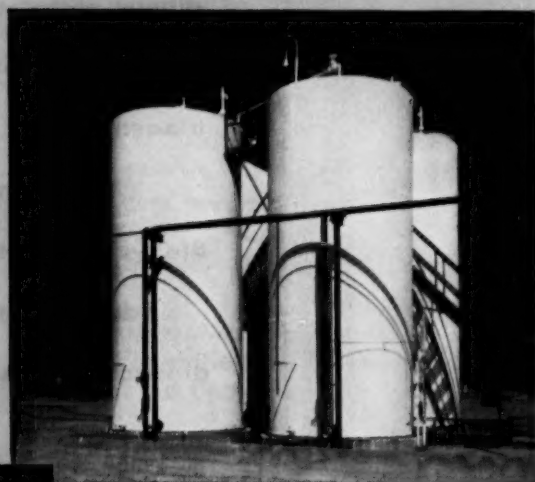
As a leading supplier of quality plasticizers, Eastman is pleased to announce the addition of di-isooctyl phthalate to its line. Manufactured from a new, improved type of isooctyl alcohol, this plasticizer possesses the excellent qualities for which the present Eastman plasticizers are noted. It is available in drum, tank truck and tank car quantities. DIOP is only one of the many fine plasticizers made by Eastman. For further information on any of the plasticizers listed above, write or call your nearest Eastman representative.

**SALES OFFICES:** Eastman Chemical Products, Inc., Kingsport, Tenn.; New York—260 Madison Ave.; Framingham, Mass.—65 Concord St.; Cincinnati—Carew Tower; Cleveland—Terminal Tower Bldg.; Chicago—360 Michigan Ave.; Houston—412 Main St.; St. Louis—Continental Bldg. **West Coast:** Wilson Meyer Co., San Francisco—333 Montgomery St.; Los Angeles—4800 District Blvd.; Portland—520 S. W. Sixth Ave.; Salt Lake City—73 S. Main St.; Seattle—821 Second Ave.

**Eastman**  
CHEMICAL PRODUCTS, INC.,  
KINGSPORT, TENNESSEE  
subsidiary of EASTMAN KODAK COMPANY

# EPON<sup>®</sup> RESIN does it!

**New paint  
lasts years  
...resists  
corrosive spillage  
at  
Diamond Alkali  
plant**



## HERE'S HOW...

PAINT LEADS a hard life at the Diamond Alkali Company agricultural chemicals plant in Houston, Texas . . . and no ordinary paint can survive there for long!

A few reasons for paint failure: Processing vessels and storage tanks are subjected to spillage of chlorinated hydrocarbons and benzene, and some also to heat. In parts of the plant, painted surfaces are exposed to the highly corrosive fumes of hydrogen chloride and sulfuric acid.

In their search to find a tougher, longer lasting paint, Diamond Alkali maintenance men tried coatings of many types, including heavy duty maintenance finishes. Some "washed

off" immediately; some lasted 6 to 8 months. Finally, Epon resin coatings based on the XA-200 formulation were tried — and found outstandingly successful.

The Epon cold-cured paint, applied by spraying throughout the entire plant, has been in service for *more than two years with no failure*. Painting costs — for both material and labor — are a mere fraction of what they formerly were, reports Diamond Alkali.

Call on our sales offices for names of suppliers who sell Epon resin coatings for your needs. Write for the full Epon coatings story in the new brochure, "*Planning to Paint a Pyramid?*"



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## Guilt Not Presumed

A papermaking concern is the latest firm to benefit from a 1953 Supreme Court decision to the effect that you don't have to prove your innocence if the government finds that your purchasing agents are buying supplies for your company at bargain rates.

Last week, the Federal Trade Commission dismissed charges that Crown Zellerbach Corp. receives illegal price advantages over its competitors in purchase of certain materials. Basis for the dismissal—by 3-to-1 vote, with FTC Chairman Edward Howrey not participating—was the Supreme Court's decision in the Automatic Canteen Co. case.

That case tested FTC's first effort to enforce the Robinson-Patman Act against a buyer who benefits by price discrimination. FTC had filed a series of such cases after World War II. The theory—much like that used successfully in the courts against sellers who grant discriminatory prices—was that all FTC had to show was that the buyer knew he was getting prices that were lower than the seller's list prices.

FTC argued that once this was shown, a buyer—like a seller—must bear the burden of proving the challenged prices were not illegally discriminatory. The high court disagreed, accepted the argument of Automatic's counsel—Edward Howrey—that FTC itself has to prove that the buyer knew or should have known that the price cuts he got were illegal.

## Laminating Snarl-up

Two lawsuits in two different courts represent the differences that have sprung up between Dearborn Chemical Co. (Chicago) and Wyndmoor Mfg. Corp. (Newark, N.J.) in a snarl-up over patents on processes of laminating and coating certain materials. Among the questions posed by the litigation:

- Are you justified in breaking off a licensing agreement if the licensor fails to prosecute infringers?

- If your patent is infringed in work done for the U.S. Army, can you collect damages through the U.S. Court of Claims?

- Are Dearborn patents Nos. 2,311,572 and 2,311,573 valid?

So far, Dearborn holds the edge in

this controversy. It started proceedings by bringing suit in Essex County Superior Court (New Jersey), asking judgment for royalties allegedly owed by Wyndmoor under licensing agreements on those patents. Wyndmoor delayed making an answer to that complaint, so Dearborn won a default judgment.

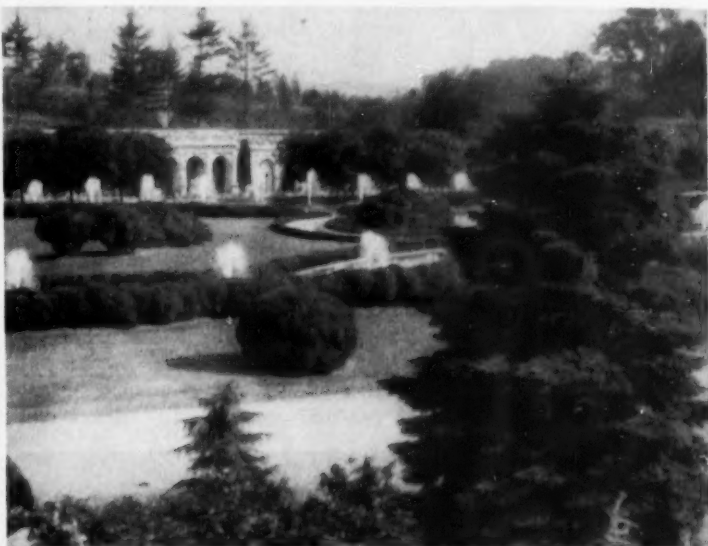
**Postponement Gained:** But Wyndmoor then went into federal district court at Newark and got a temporary order that at least postpones the effect of that judgment. Meanwhile, Federal Judge Thomas Meaney has required Wyndmoor to post \$500 security pending arguments on making permanent that temporary restraining order.

Wyndmoor also gained additional time in which to answer the complaint in state court. The Newark company contends that certain phases of the action in the state court involve patent

questions that have to be decided in a federal court.

The two patents were issued in 1943 to A. H. Reynolds and R. A. Shoan, then assigned to Dearborn. Wyndmoor says it entered into a licensing agreement with Dearborn in 1951, and that the contract provided that Dearborn would prosecute infringers. This, charges Wyndmoor, Dearborn failed to do; and so Wyndmoor canceled the agreement in Feb. '53. Dearborn instituted the royalty suit in Nov. '54.

Wyndmoor is asking the federal court to declare the patents invalid on grounds that the processes were generally known before the patents were issued; and also wants a ruling on liability in case it's decided that there was infringement in certain laminating and coating work done by Wyndmoor for the Army Procurement Service.



## Due For a Pruning?

PROCEEDINGS will be filed in Chester County Court this month to determine whether the late Pierre S. du Pont was a legal resident of Pennsylvania. Hanging in the balance: his bequest of \$50-60 million to the Longwood Foundation—whose main interest is operation of Longwood Gardens, a horticultural wonderland at Kennett Square, Pa.

If Pennsylvania Attorney General Frank Truscott can prove that the former president and board chairman of Du Pont Co. and General Motors was actually a resident of Longwood at the time of his death, the bequest to the foundation will be depleted some \$5-10 million by deduction of Pennsylvania inheritance taxes.



## Cooperation for Pleasure

WHEN MANAGMENT and workers of Ethyl Corp. at Houston met and signed purchase papers for a 50-acre recreation site last month, it was a historic step for the company.

Observers in the Houston area were hardly surprised, however. Texas companies have recently been leaning heavily toward buying elaborate recreation facilities—as a function of both employee and public relations.

Ethyl Corp.'s purchase was made officially by its company club—the Ethyl Recreation Association of Houston (ERAH)—members of which had voted last October to increase dues as a preliminary

move to purchase. The company matched its contributions dollar for dollar; total price paid for the property (which includes a two-story brick house, swimming pool, barbecue facilities, two lakes and frontage on Clear Creek): \$78,000.

Improvements will be made on the property before spring, but members of ERAH are already reportedly making the 25-mile safari out from Houston to look over their new acquisition.

"We've rarely seen such a spontaneous reaction of enthusiasm," notes one company official. "Employees from all areas in the plant are joining in plans for gatherings, spring and summer outings."



## LEGAL

**Master Recording Mix-up:** A lawsuit over a phonograph-record patent and a related patent application has been filed in U.S. District Court at New York, and a chemical firm is listed as one of the defendants. Plaintiff is Earle Jones (Hastings-on-Hudson, N.Y.), who last year received patent No. 2,666,651 on a method of making master recordings and who has an application (Serial 394,075) pending for a patent on a device for cutting those records. Jones charges that Radio Corp. of America, Columbia Records and Columbia Broadcasting System have been making and using records via his process without his permission; that Fairchild Recording Equipment Corp. has been supplying the yet-unpatented cutting devices; and that Union Carbide's Bakelite Division—which makes and sells plastics and other materials for phonograph records, and which maintains a laboratory for testing sample recordings—got from him the necessary technical information and passed it on to those other companies. Up to last week, the defendants had not yet filed their replies, but it was expected that each would make a general denial.

**Libel Decisions:** It isn't often that you hear of a chemical libel suit, but one was in the news last week:

• At Cincinnati, a jury strung along with a newspaper that had defended water fluoridation as a public health measure against a local radio commentator who had warned his listeners that fluoridation would up the death rate and cause more cancer. The *Cincinnati Enquirer*—in an editorial reply—cited medical and dental authorities' opinions to the contrary, then charged that the commentator's "misleading statements, delivered in highly dramatic style, did great harm by causing needless fears." The jury found that this was fair comment and criticism of public affairs and public figures. The commentator—who had sued for \$1 million—has announced that he'll appeal. He asserts that he was "personally and professionally" hurt by the editorial. Judge Joseph Woeste told jurors that a newspaper "has the right, if not the duty" to criticize newsworthy persons.





# SAFETY

*is a vital part of our construction service*

Several factors combine to make a Blaw-Knox Chemical Plants Division construction job move smoothly, speedily, to a trouble-free completion. One of these is *safety* in construction activities.

Here the Chemical Plants Division has an outstanding record, which is recognized by safety awards such as these:

- **Associated General Contractors of America**  
14,090,000 man-hours awarded 1953 *First Place* in Group A, which covers all member contractors doing over 500,000 man-hours of work annually.
- **National Safety Council Awards of Honor**  
(for work without a lost-time accident)  
4,112,095 man-hours for the DuPont Company at Charlestown, Indiana, from December 1952 to May 1953.  
1,649,574 man-hours for the Atomic Energy Commission at the Hanford Ordnance Works, Richland, Washington, from September 1953 to January 1954.  
1,233,097 man-hours also at Hanford Ordnance Works, between July and September 1954.

But safety at Blaw-Knox does not start or end with construction. Safety provisions on all Chemical Plants Division projects are made a most important part of every stage of planning, designing and selecting of materials and equipment, and they extend beyond the period of construction. Safety records in plants designed and erected by our engineers, as an example, are among the best to be found anywhere.

Chemical Plants Division is the engineering-constructing organization of the Blaw-Knox Company which designs and builds plants for many industries, including chemicals, detergents, drugs, fats and oils, fertilizers, foods, gases, low temperature, nuclear energy, petroleum, petrochemicals, resins and plastics, synthetics and wood utilization. Let us help you solve your planning, engineering and construction problems . . . on all or any part of your project.



## BLAW-KNOX COMPANY

*Chemical Plants Division  
Pittsburgh 22, Pennsylvania  
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B & I

SCHEWAB, GENEVA



ILO HEADQUARTERS, DELEGATE O'CONNELL (U.S.) AND CHAIRMAN HARRY (AUSTRALIA): On symbols, a split.



U.S. DELEGATES LEWIS AND CRASS, POPE AND MCCOY: On productivity, a near-unanimous plea for cooperation.

## At Geneva, World Chemical Congress

Fact-finding, recommendations, and making personal contacts—these were the “order of business” at the fourth meeting of the Chemical Industries Committee of the International Labor Organization last month at Geneva, Switzerland.

Chemical management in the U.S.—which has been a bit skittish about taking part in this group (*CW*, Feb. 19, p. 15)—will be relieved to know that just these four principal resolutions were adopted at the close of the two-week session:

- By vote of 73 yes, 16 no, 26 abstaining, a resolution asking the ILO to recommend to all member nations that five pictorial symbols be used on labels of dangerous chemicals in world trade. Still to be decided: the symbol to be used for corrosive liquids. (U.S. worker delegates voted “yes”; U.S. government and employer delegates abstained.)

- By unanimous vote, a resolution asking the ILO to draw up and keep up to date a list of the dangerous chemicals that should be labeled with those warning symbols; and asking that all member nations take cognizance of that list.

- By vote of 110 yes, 1 no, a resolution recommending continued increase of production and productivity throughout the chemical industries; declaring that employees should receive “an equitable share” of all benefits from increased productivity; holding that employers should accept the responsibility to see that higher productivity does not lead to unemployment, and calling for intensive research into various phases of productivity problems. (All U.S. delegates voted “yes,” but the employer delegates stated they did so with reservations concerning three of the clauses.)\*

- By vote of 54 yes, 38 no, 13 ab-



CANADIAN DELEGATE JONES: An employee relations specialist.

\* U.S. employer delegates explained that the provisions about “safeguarding the interests of workers affected by technological improvements” did not take sufficient account of the difficulties involved; the paragraph about labor-management planning on systems of payment by results did not take account of plant-by-plant bargaining in the U.S.; and the conclusion that “free and independent organizations of employers and workers can make a valuable contribution to increasing productivity” was not consistent with U.S. antitrust laws.

AT THE FRONTIERS OF PROGRESS YOU'LL FIND

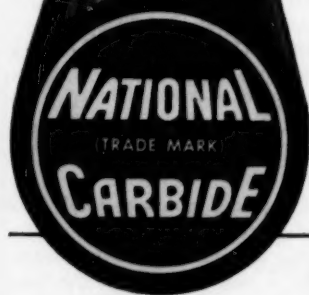


## PIPELINE TO PURITY

### *Acetylene from National Carbide*

At Calvert City, Kentucky, National Carbide delivers pipeline acetylene of consistently high purity. Further purification to exacting standards is easy and inexpensive.

With completion of the expanded production program in the Calvert City plant, high-purity acetylene is now in plentiful supply. This new chemical center is close to suppliers of processing chemicals . . . close to important consumer markets. On the site are rail and river transportation, natural gas and TVA electric power. If you require an economical source of acetylene we welcome the opportunity to discuss Calvert City and high purity National Carbide acetylene with you.



## ***National Carbide Company***

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NATIONAL CARBIDE COMPANY is a division of AIR REDUCTION COMPANY, INCORPORATED  
AIRCO—industrial gases, welding and cutting equipment and acetylenic chemicals  
PURECO—carbon dioxide, liquid-solid ("DRY-ICE")

Principal products of other divisions include:  
OHIO—medical gases and hospital equipment  
COLTON CHEMICAL COMPANY—polyvinyl acetates, alcohols, and other synthetic resins.

# Research opens potentials for

# Cachalot

# fatty alcohols

● **Reservoir covers?** Latest use for cetyl alcohol: a thin wax film over open reservoirs to cut water loss by evaporation 30%. Your coating problem may not be quite as spectacular but CACHALOT brand cetyl alcohol might do the job. And doesn't this suggest that today's costs are probably lower than you think?

● **Acetylene reactions** utilizing long-chain fatty alcohols to yield vinyl esters are gaining the attention of chem-men. As a step to polyvinyl ethers, any of the fifteen basic types of CACHALOT aliphatic alcohols offers the same lot-to-lot uniformity . . . a result of production techniques worked out during more than twenty-five years of research in this business.

● **Free-flowing hydraulic fluids** often get that way by the addition of small amounts of stearyl alcohol. Non-corrosive CACHALOT stearyl alcohols have acid values well below 0.1, are vacuum-distilled to tight specifications. USP or technical grades ready for prompt delivery.

● **Non-ionic detergents** satisfy market demand for utmost cleaning power when formulated with oleyl alcohol as a starting point. Dept. of Agriculture studies show oleyl-derived polyoxyethylenes to be superior cleaners, easy to make. You have a wide choice of CACHALOT oleyl and cetyl-oleyl mixtures in all price ranges.

● **What's yours?** CACHALOT fatty alcohols may solve one of your current problems. Why not look through the booklet "Possibilities" for ideas you can use? Just a note on your letterhead . . . or send the coupon to M. Michel and Company, Inc., 90 Broad Street, New York 4, N. Y., thirty years a basic supplier to chemical manufacturers.



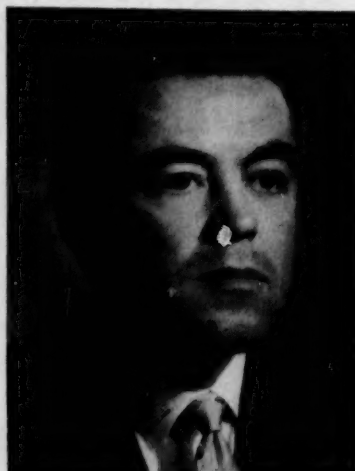
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Send me facts on CACHALOT fatty alcohols:

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company .....  
address .....

## BUSINESS & INDUSTRY



**DR. KAY OF CANADA:** On occupational health, a professional viewpoint.

staining, a resolution inviting the ILO to put on the agenda for this committee's next meeting—which will probably be held in Geneva in late 1957—the question of reduction of hours of work in chemical plants. (U.S. worker delegates voted "yes"; the employer delegates and one government delegate voted "no"; and the other government delegate was absent then.)

**One Red Vote:** The lone dissenting vote on the productivity resolution came from Roger Pascre, French worker delegate, who is secretary of Chemical Workers Unions Federation of the Communist-led General Confederation of Labor. Pascre complained about the fact that the Iron Curtain countries were not repre-

sented, then started a political speech that was soon cut short by Australian government delegate Ralph Harry, who served as chairman. Pascre had introduced a productivity resolution of his own, but it was rejected by the worker delegates.

The 36-year-old ILO—whose purpose is "to contribute to lasting peace by improving labor conditions and living standards"—is a United Nations affiliate with some 70 member countries. Twenty-one of those countries are now represented on the Chemical Industries Committee, which was set up by ILO in 1946. Since the 1952 session, Brazil and Nationalist China have left the committee; Australia, Chile, Finland, Israel and Japan have been added.

U.S. delegates to this session: Horace McCoy, deputy administrator, Business & Defense Services Administration of the U.S. Dept. of Commerce; William Pope, safety engineer, U.S. Dept. of Labor; Ember Dwyer, manager of personnel relations, Monsanto; Maurice Crass, Jr., secretary-treasurer, Manufacturing Chemists' Assn.; John Lewis, vice-president, International Chemical Workers Union (AFL); and Michael Ross, CIO representative in Europe. Serving as technical advisers to the employer delegates were Henry Johnstone, senior vice-president, Merck; and Francis O'Connell, director of industrial relations, Allied Chemical & Dye.

Canada was represented by John Mainwaring, Federal Dept. of Labor; Dr. Kingsley Kay, Occupational Health Division, Dept. of National Health & Welfare; S. C. Jones, manager of employee relations, Canadian Industries (1954) Ltd.; William Kirk, director of industrial relations, Dow Chemical of Canada; Silbey Barrett, District 50, United Mine Workers; and George Downing, Trades & Labor Congress.

A Netherlands worker delegate summed up the meeting for CW like this:

"The workers' group got nearly all it wanted—a majority vote for putting reduction of hours of work on a future agenda; a majority vote on the label symbols; and consideration of workers' requests in the productivity problem. But we still have to fight for these things on a national level in many countries. So far, these are only recommendations."



**LABOR DELEGATE BARRETT:** For chemical workers, a veteran spokesman.





## From Accelerators to Wetting Agents— Rohm & Haas Methylamines

Rohm & Haas methylamines are ideal low-cost sources of basic organic nitrogen. They can be used as intermediates for many products, including rubber accelerators, pesticides, surfactants, quaternary disinfectants, pharmaceuticals, photographic developers and dyestuffs.

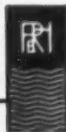
All three amines, mono-, di-, and trimethylamine, are supplied in both aqueous and anhydrous form, in drums, cylinders, or tank-cars. Large volume production in two separate plants guarantees you continuing availability; Rohm & Haas' twenty years experience in producing and handling methylamines assures

you products of high purity and uniform, dependable quality.

Detailed, authoritative literature covering the use of these products is offered to assist you in research, process development, and plant design.



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& 6000 CPS and water-  
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- Low cost thickeners for inks, paints, lacquers, hot-melt coatings.
- Exceptional light stability, strength, and water-resistance for coatings and adhesives.
- Corrosion resistance for metallic inks used on cellophane, glassine, and plastics.
- Versatile adhesives for everything including metals, plastics, ceramics, paper, cork.
- Clear, flexible, high-gloss coatings for decoration and heat-sealing.

Write for further information  
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representative call at your  
convenience.

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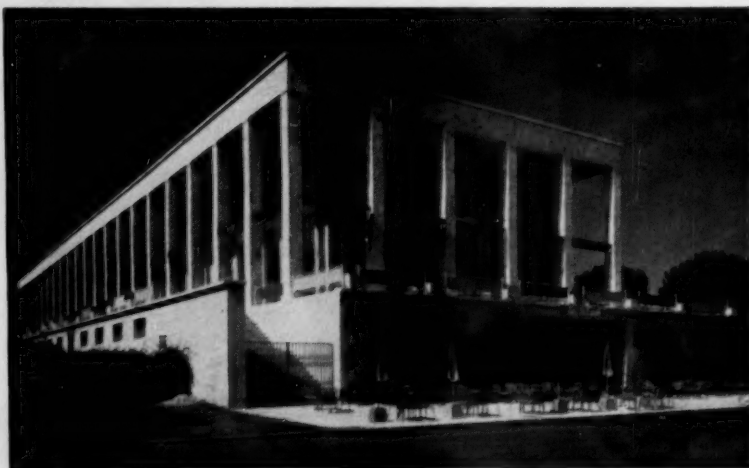
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## BUSINESS & INDUSTRY



THE CONGRESS BUILDING: The Fourth World Oil Congress comes to Rome.

## FOREIGN.

**Oil Congress/Italy:** This year's World Oil Congress (fourth in a series that began in London in 1933) will meet June 6-15 in the Universal Exhibition Grounds in Rome. Purpose: to discuss and examine technical and economic developments in connection with the oil industry.

This year, petrochemicals will come into the spotlight prominently, permanent council delegates say. One specific sector of the agenda has been assigned to discussion of developments in "Chemical By-Products" of petroleum; speakers are being booked from the U.S., Great Britain, Italy and West Germany.

**Swiss Foreign Trade:** With a total value of nearly 11,000 million Swiss francs, Swiss foreign trade in 1954 attained an all-time record. Chief reason for the rise: increased chemical and pharmaceutical exports.

West Germany continues to be Switzerland's biggest chemical customer; the U.S. is now running a close second; Italy lags in third place.

**Cement/Peru** Compania de Cemento Chilca, S.A., has brought onstream its 1500-bbl./day cement plant outside Lima. Located near limestone quarries reported to have reserves of more than 100 million tons of ore, the plant should be able to supply all Peruvian cement requirements, have some output available for export.

**Expansion/Japan:** The Shell Petro-

leum Co. of London plans to join forces with the Shewa Oil Co. and Mitsubishi Kasai Co. (Tokyo) to build an industrial chemical plant in Japan if the former Naval Fuel Depot at Tokuyama can be secured as a construction site. Company officials are now in Japan—inspecting the depot, and negotiating with the two Japanese firms on financing details.

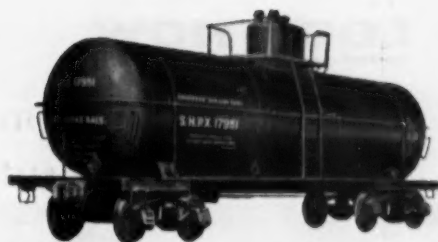
**Fertilizer/Mexico:** There's a quiet but fierce battle raging in Mexican government circles over that country's proposed new fertilizer plant at Coatza-coalcos, on the Gulf Coast. Reason: a number of government officials are violently opposed to the plan of bringing in foreign capital to underwrite construction on the ground that to do so is mortgaging the nation's wealth. Others frankly would welcome any solid proposal from friendly foreign capital.

Mexico, meanwhile, is still suffering from an 800,000-ton/year deficit in fertilizer production. (Consumption: 1 million tons; production: 200,000 tons).

The controversial plant would virtually wipe out this drain on the country's financial resources (as well as plow money back into the economy through purchase of sulfur from all three sulfur-producing companies on the Isthmus of Tehuantepec).

Many influential Mexicans remain to be convinced that the move is sound, however—they even frown on a World Bank loan, saying that it would only further nationalize Mexico's chemical industry.

# Inside story of Duradome



QCF

-BUILT FLUED DOME TANK CAR



Interior view of I.C.C. 103-W Duradome tank car



No more old fashioned dome shelf, undesirable fillet welds and hard-to-clean areas in the new Duradome tank car.

A completely *smooth* interior in all Duradome cars provides the following important advantages:

- Easier to clean.
- Better application of lining.
- Greater resistance to corrosion.
- Increased structural strength.

All this is made possible by a million dollar press which actually *flues* the dome base out of the heavy steel center section of this newly designed car.

Whatever your tank car requirements, you'll find a Duradome built for your purpose. *And Duradome benefits cost you no more.* See your Shippers' representative today . . . let him show you the facts on the most advanced tank car in 15 years!

DURADOME tank cars are available in all standard types and capacities . . . for sale or lease through . . .



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March 5, 1955 • Chemical Week

## LOOK HOW

### *Linde* has improved silicone rubber



## LOOK AT the benefits

Heat- and cold-proof motor mounts in thick sections, gaskets, oven door seals, and other equipment are practical to a new degree with a special LINDE Silicone rubber gum stock just made available. Built into each molecule is a curing mechanism, known as "controlled reactivity," that provides all the valuable qualities of other silicone rubbers—plus important new ones.

To the product designer as well as the rubber manufacturer, the great advantage lies in this new silicone's ability to yield controlled properties by means of vastly simplified techniques.

Important among the new properties are extremely low compression set and good resistance to high pressure steam over a wide range of hardnesses, and without sacrificing good elongation and tensile strength.

Investigate this durable new silicone rubber. Extremely important applications can be found in the automotive, aviation, electrical, and chemical fields. The work of LINDE and other divisions of Union Carbide makes LINDE particularly qualified to assist you. Write Dept. L-31.

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B & I . . . . .



WIDE WORLD

UNIONIST GOLD: His affidavit may be false, but union eligibility unhurt.

## LABOR . . . . .

**Union Still Eligible:** Even though a union officer's non-Communist affidavit may be false, his union is still eligible to use the services of the National Labor Relations Board. That's the ruling of the U.S. Court of Appeals in the test case involving Ben Gold, former president of United Fur & Leather Workers (Ind.), who was convicted last year of having falsely certified that he was not a member of the Communist Party. This ruling is expected to cover a similar case concerning International Union of Mine, Mill & Smelter Workers (Ind.) and its former secretary-treasurer, Maurice Travis. Both Gold and Travis were admitted Communists up to 1947, when the Taft-Hartley Act was passed. Both unions—which have locals at a few chemical plants—were ejected from the CIO five years ago on grounds of alleged Communist domination.

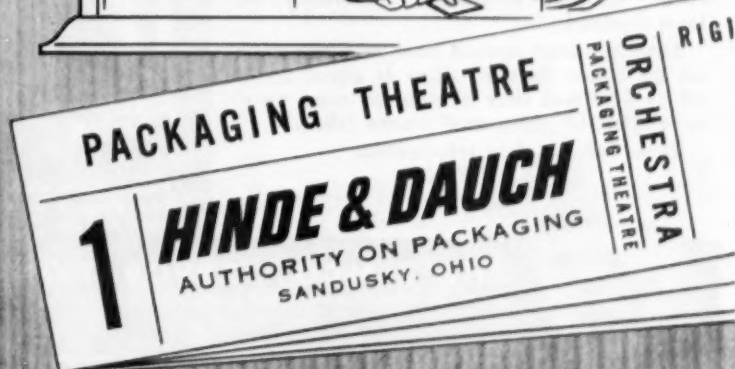
**Small Audience Big Enough:** With one post still vacant and one member not taking part, the National Labor Relations Board ruled last fortnight that no matter how few employees are listening, neither an employer nor a union official is permitted to make "election speeches" on company time within 24 hours before a representation election. NLRB members Abe Murdock and Philip Ray Rodgers made up the majority; Chairman Guy Farmer dissented, arguing that a cer



Meet

# CoraGated ...

the packaging  
industry's  
number one  
"box" office  
attraction





## THE EIMCO BURWELL

Plate and Frame Filter users will appreciate this new Eimco filter because it does **EASILY** so many of the jobs that were long tedious tasks on the conventional Plate and Frame Filter.

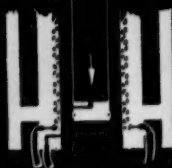
Take for instance the long job of opening and closing — now, with the Eimco, it's a matter of push-button control with instant response, takes no time at all.

Cleaning, which may take hours on the conventional machine, requires no down time on an Eimco, simply rotate the cleaned frame into position and start filtering again.

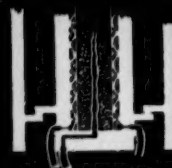
You get several times the washing efficiency with an Eimco over conventional plate and frame filters. The split cake which is evenly formed over the entire surface of each plate is washed by introducing the wash water through the feed port. Thus both surfaces of filter media are utilized for the outward passage of wash liquor, instead of only one surface as on conventional plate and frame filter. Washing efficiency is, therefore, at least doubled.

**One hundred square feet of filter area on an Eimco Burwell filter is equal to 5, 10 or 20 times that amount of area on a conventional plate and frame filter.**

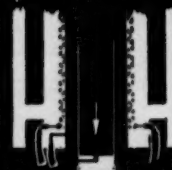
Write for complete information.



Plates open to allow frame to enter and position for filtering.



Plates closed on frame — in this position the feed, wash and blow portion of the cycle are completed.



Plates open to allow filled frame to move down and out.



## THE EIMCO CORPORATION

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B & I . . . . .

tain New York City election shouldn't be set aside merely because a company official had talked to less than 2% of the workers who voted.

**Two Wins, One Loss:** Labor unions chalked up one victory, one switch, one resounding defeat in recent chemical plant elections:

- At the Virginia-Carolina plant (Cincinnati), employees voted nearly unanimously to be represented by International Chemical Workers Union (AFL).

- Employees of California Spray Chemical (Richmond, Calif.) have voted to shift from the left-wing International Union of Mine, Mill & Smelter Workers (Ind.) to Oil Workers International Union (CIO).

- A company's argument that work on military contracts would be hampered by union security rules apparently convinced employees of Aerial Products Co. (Elkton, Md.). Results of last week's NLRB poll: for "no union," 514 votes; for United Gas, Coke & Chemical Workers (CIO), 60; challenged ballots, 16; not voting, 34.

## KEY CHANGES. . .

A. B. Steele, to manager, and C. P. McClelland, to assistant manager, Technical Services, Carbide and Carbon Chemicals Co., division of Union Carbide and Carbon Corp. (New York).

Louis E. Wolfson, to president, Devco & Reynolds Co., Inc. (New York).

Kenneth C. Russell, to president, Nuodex International, Inc. (New York).

Jervis J. Babb, to board chairman, and William H. Burkhart, to president, Lever Bros. Co. (New York).

Charles R. Fay, to comptroller, Pittsburgh Plate Glass Co. (Pittsburgh, Pa.).

Quentin F. Egbert, to director, purchases, Columbia-Southern Chemical Corp. (Pittsburgh, Pa.).

W. D. Celmer, to research supervisor, Chemical Research and Development Dept., Chas. Pfizer & Co., Inc. (Brooklyn).

George B. Wemple, to vice-president, Mutual Chemical Co. (New York).

Eugene Easterly, to vice-president, distribution, and E. G. Hickling, to vice-president, operations, Linde Air Products Co. (New York).

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#### DAREX POLYVINYL ACETATE EMULSIONS

- for paints, adhesives, textile and leather finishes, and coating materials.

#### DAREX EVERFLEX EMULSIONS

- for paints, coatings, textile sizes and adhesives.

#### DAREX COPOLYMER RESINS

- for shoe soles, floor tiles, wire and cable insulation and rubber mechanical goods.

#### DAREX PLASTICIZERS

- for vinyl compounding, nitrocellulose lacquers and food packaging materials.



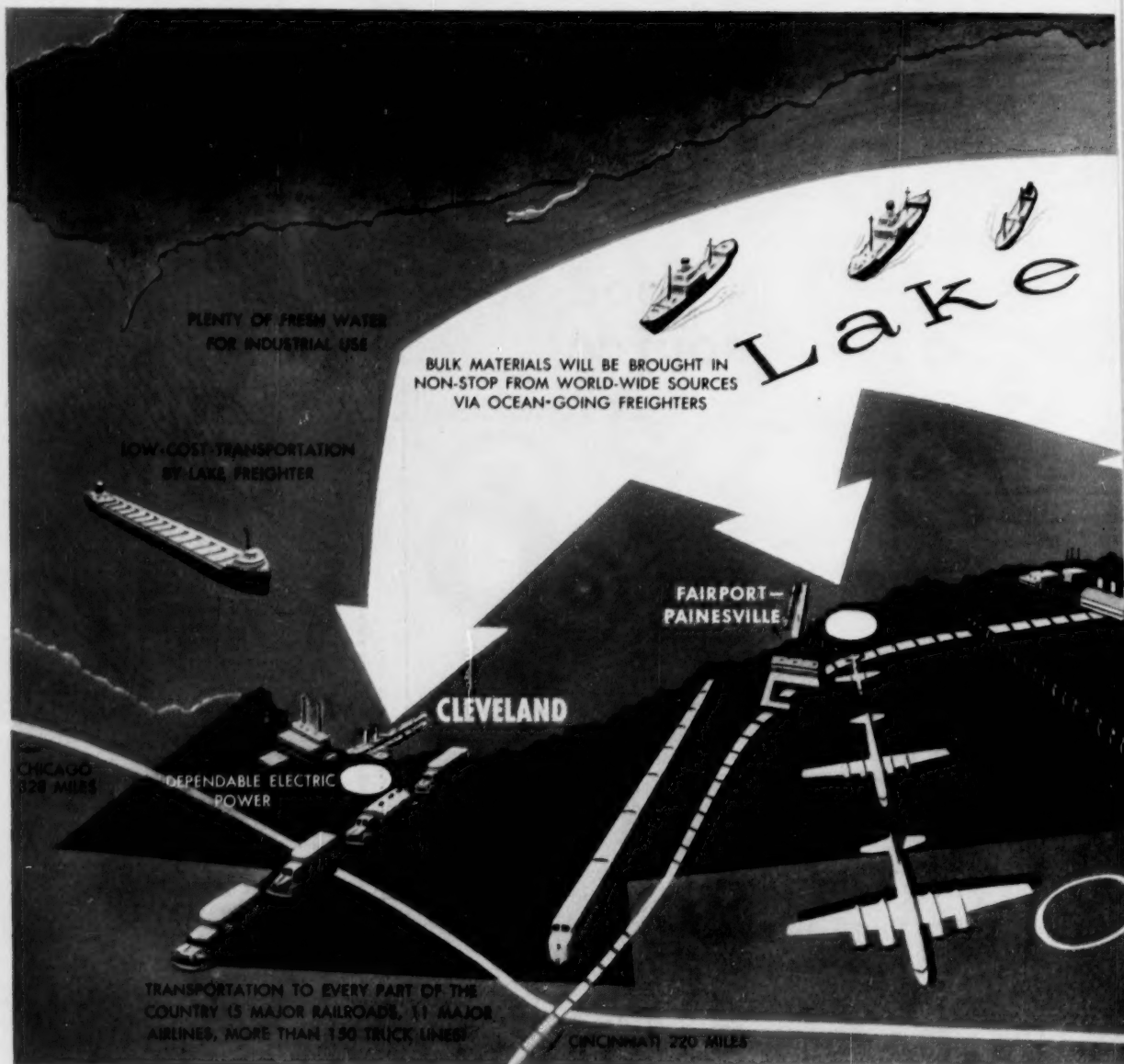
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## St. Lawrence Seaway makes possible.. opportunities never before

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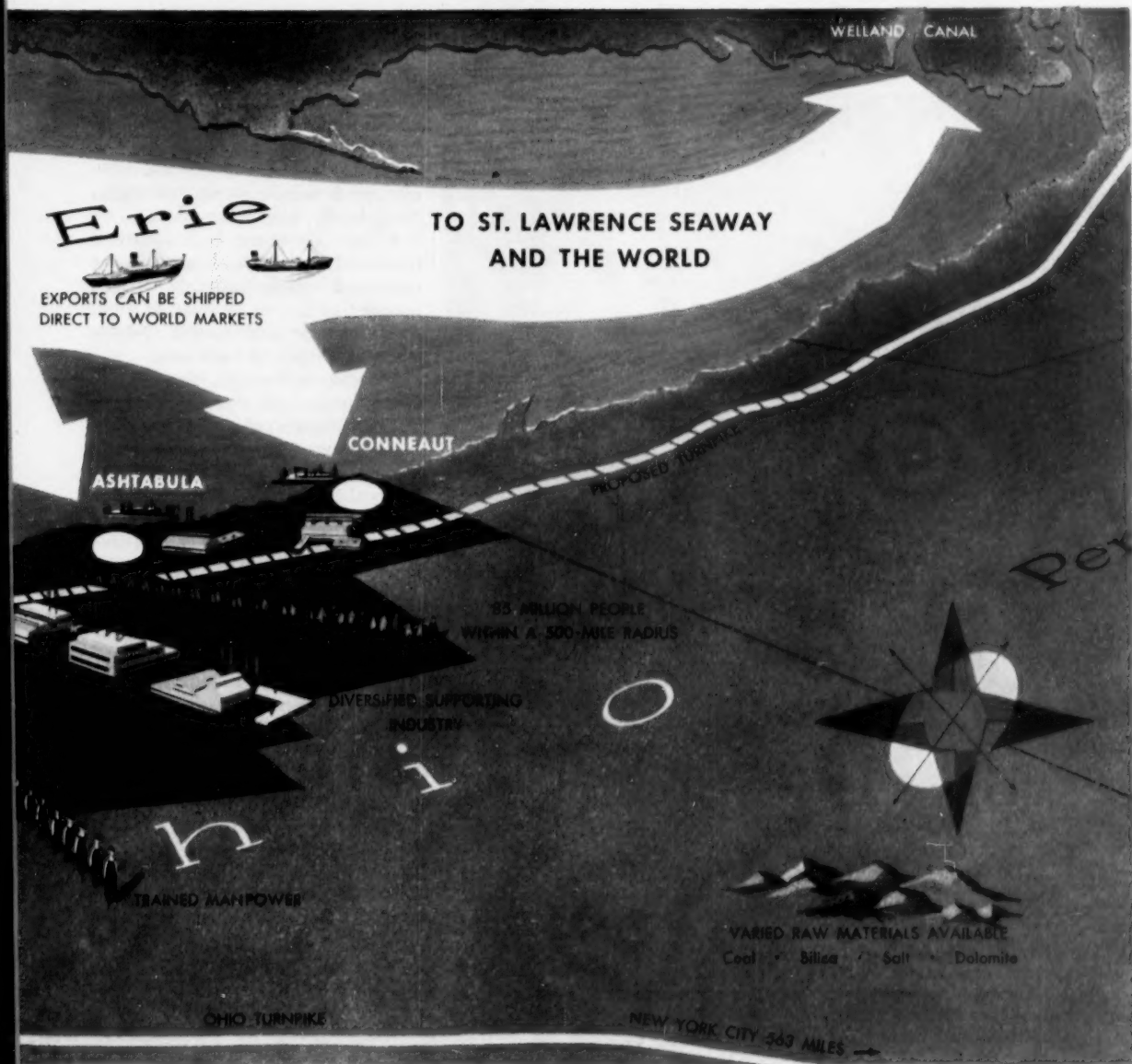
With the St. Lawrence Seaway, a long-time dream of industry is now about to come true. For the first time in history, industry will be able to have the advantages of a "heartland" location—in the midst of the nation's greatest markets and resources—combined with low-cost ocean shipping to or from anywhere in the world!

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Within a 500-mile radius of this Northeast Ohio area are over half the people in the country—eleven of America's fifteen largest cities. At hand, or within a short haul, are most of the basic materials of industry . . . fresh water, coal, iron, salt, limestone, and many others. Even without the Seaway, the advantages of "the best location in the nation" are so great that two billion dollars have been invested here in industrial expansion since 1944.

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materials can be brought in directly by ocean freighter at minimum cost. Manganese, phosphates, and other raw materials for the first time can be economically processed in the midst of the markets where the finished product is consumed. And heavy machinery can be exported to world markets at lower cost. With the Seaway scheduled for completion in five years, the time to plan for a plant location along Ohio's "Seaway Shore" is during this coming year. We will be glad to help you do it.

### NEW FILM SHOWS ADVANTAGES OF PLANT SITE ON OHIO'S "SEAWAY SHORE".

A factual, 28-minute sound movie in color. To arrange a showing for your key people or industry group, write in confidence on company letterhead to R. L. DeChant, Manager, Development Department, The Cleveland Electric Illuminating Company, 83 Public Square, Cleveland, Ohio.

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DOCUMENTATION, INC.'S MILLER AND TAUBE: Their stock in trade is . . .

## Logic for Literature

Common sense may never be for sale but, beginning next week, a researcher's dollar will buy a fair share of applied logic. At that time, a new chemical patent index, drawn from the principles of formal logic, will become available. Applicable to the full run of scientific literature, the index's rationale may contain the answer to one of the most pressing problems of research: how to stay on top of the fast-growing mountain of published technical information.

That, at any rate, is the feeling of the men behind Information for Industry, Inc., the company set up to sell the patent service to industry.

The scope of their aspirations, however, is not limited to research. Any one who needs chemical patent information may subscribe to the service for one year at \$1000.\* What the subscriber receives, six times a year, is a small book that keeps tabs on all chemical patents issued from Jan. 1, 1955.

\* This buys one copy of the index. The next four copies would cost \$750/copy/year for the same subscriber; while copies in excess of five come to \$500/copy/year.

Material contained within each volume is keyed to a variety of essential categories: products; applications; intermediates; solvents; catalysts; apparatus; chemical classes; inventors; assignees; and many others. Each index book is cumulative, covers all patents issued back to Jan. 1, '55.

By manipulating the index book's pages in accordance with a disarmingly simple system, all patent references to nearly any conceivable subject can be spotted in a matter of minutes. If there is no reference to the topic in question, that information, too, is yielded quickly. And all that is required is one small book. In a nutshell, these are the claims of Eugene Miller, one of the young firm's directors who claims that the system cuts chemical patent indexing costs from the prevailing \$5/patent to about 17¢.

**All in the System:** The "system" is the product of logician Mortimer Taube, a Ph.D. in philosophy and also a director of the new company. Based on the use of single-word (and single-term) indexing categories,

Taube's method—dubbed Uniterm—was arrived at after a long tussle with logic in its pure form.

Its simplicity of application, however, tends to belie its rigorous origin. Here, briefly, is how it works:

- Each document in a library is numbered and new documents are numbered consecutively on arrival; the number has no meaning in itself, serves only as identification (patents come, of course, with numbers).

- Someone—librarian, chemists, etc.—next surveys the documents to be filed for single-word (or -term) subject headings. Examples: "chemical"; "organic"; "temperature"; "plasticizer"; "molecular weight"; "resin"; "high"; "fluid"; "entropy"; "medicinal"; "atoms"; "vinyl"; "paper"; "radioactivity"; etc.

- For each subject heading there is a card bearing the name of the heading at the top. The number of the document containing that term is then merely stamped on the card. Cards have ten columns, so they hold a lot of numbers; conversely the same document number may appear on many subject cards.

To locate source material on any desired subject, the searcher extracts the proper cards from the file and jots down the pertinent numbers. If he is looking for information on a single-term subject such as plasticizers, his task is simple: he takes out the "plasticizer" card and finds every reference his library makes to plasticizers. If however he is looking for references to something more definite in the way of plasticizers—e.g., vinyl plasticizers—he must take out two cards; and if, for instance, he is after references to the still more specific subject of vinyl resin plasticizers (as opposed to a special case, such as vinyl film plasticizers), he locates three cards.

Any number common to all three cards identifies a document containing information on these plasticizers. In practice, these cards would be reproduced on pages and bound into a book. Two identical books, mounted side by side, simplify the task of matching numbers.

The logical foundation for this scheme is clearly represented on the opposite page. Symbolically, each circle encloses all of the information on the subject named. Shaded overlapping areas represent material com-

mon to two subjects, and the solid center section symbolizes area common to the three categories.

Section no. 1, for example, represents vinyl plasticizers; no. 2 contains information on resin plasticizers; and no. 3 includes material on vinyl resins. References to each of these subjects are obtained merely by matching the appropriate two cards. Section 4, of course, encloses information on vinyl resin plasticizers, is reached by first matching any two of the cards, then comparing the numbers so obtained with the numbers on the third.

Fundamentally, the Uniterm system is a method of harnessing the mathematical analog for language purposes. Words, the digits of language, are handled in much the same way that computers handle numbers. Advantages of this procedure, according to Miller, are these:

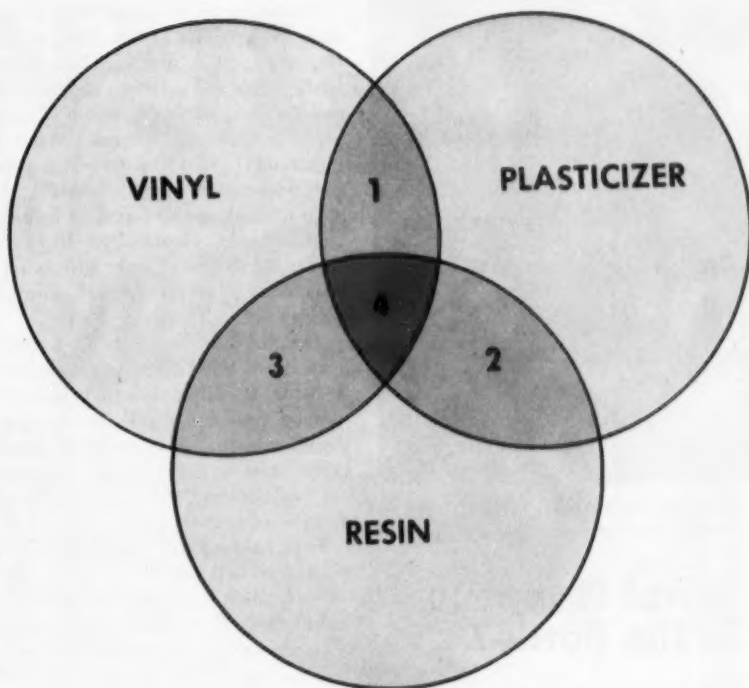
- No one must determine the category under which a document is to be indexed. Making this decision has been found to be the chief time-waster in classical indexing systems.
- Since there is virtually an unlimited number of possible word combinations, a literature searcher can find references to any subject if he has only the most cursory clue to what he is after. He can, in addition, use any word of a term (e.g., vinyl resin plasticizer) to begin his search; no rigid order of terms must be followed as in conventional systems.
- The same cards can be used to locate sources in different media in a field. Photos, for example, may be numbered and indexed like books, periodicals, blueprints, etc.

- The system requires no elaborate equipment, although it is said to be compatible with machine or manual use.

Setting up the Uniterm system calls first for a determination of the subject headings required in any field. This is done by surveying the published material to be indexed and the result usually comes to be about 3,000. That's surprisingly small to most people but it's a fair representation of the size of the vocabulary in most fields. The average college graduate, explains Miller, has a vocabulary of just about 2000 words.

"We have found," Miller goes on, "that we can cut the size of most literature storage setups by at least 90%."

## Overlap is the Key



Backing this claim is experience gained in setting up Uniterm systems in the government, a major television network (for locating scenes in over 30 million feet of film strips) and a publishing enterprise.

**Help Needed:** The system is, as a matter of fact, the indirect result of the government's attempts to cope with the torrent of literature that flowed from thousands of wartime research projects. The most recent agency that was saddled with this homeric task is the Armed Forces Technical Information Agency (ASTIA), organized three years ago by the Defense Dept.

In 1953, Taube (then chief of the Atomic Energy Commission's technical information service) approached ASTIA in the belief that he could work out a feasible solution. Granted a \$35,000 government contract, he set up a firm named Documentation, Inc., under whose standard the Uniterm system was perfected.

Documentation, Inc. is still very much in business, functions primarily in a research capacity. A privately held company (of which Taube is

president and Miller executive vice-president), it develops information handling systems and machines, takes on jobs from private clients. Information for Industry is the result of Documentation's efforts to obtain the means of marketing the Uniterm system. Also a closed company, the new organization has not found it difficult to attract investors. Aside from Taube and Miller, directors of the company include Eugene Zuckert, former Atomic Energy Commissioner, and George Moore of the Moore-Greear Management Co. President is Lynn Bartlett, Jr., also associated with Moore-Greear.

Uniterm, however, is not a panacea for the diverse woes of technical information recovery. This expansive field is still being criss-crossed by researchers at Battelle Memorial Institute, National Research Council, International Business Machines, and other private and government labs.

And right now, Information for Industry sells only a chemical patent service. But an extension of its logic-bound activities into packaged indexes of chemical research reports and electronics patents is a distinct possibility.





WISCONSIN'S GROWTH GROUP\*: Its exciting find has cancer probers asking . . .

## What Happens in the Bottle?

Fathom the secret of growth and you will have the key to some of man's worst afflictions, perhaps even to life itself. So goes the hypothesis that has sent this generation of biochemists scurrying in quest of the chemical mainspring of the growth process. Last week there was reason to believe that the searchers would soon succeed (if, indeed, they had not already succeeded) in capturing their elusive quarry.

Behind this optimism is the news (CW Newsletter, Feb. 26) that a University of Wisconsin research group has isolated crystals of a compound that causes plant cells to divide. Called kinetin,<sup>†</sup> the substance is the reward of years of research supported by the National Science Foundation, Wisconsin Alumni Research Foundation and the American Cancer Society.

According to the last named: "When a tiny trace [of kinetin] . . . is added to culture media for plant tissue cells that are long past the growth period, the cells divide and new cells continue to be formed . . .

\* Left to right: seated, Skoog and Strong; standing, von Salza and Miller.

† Derived from the word "cytokinesis," meaning cell division.

so long as kinetin is in the medium . . . When the rejuvenated tissues are placed in another medium that lacks kinetin they stop growing."

Existence of an agent that causes cells to divide is not in itself a new discovery; cell division has previously been caused by extracts from calf thymus, brewer's yeast and other plant and animal sources. What is important is that the powerful catalyst responsible for this activity has been unmasked and found to be relatively simple, chemically. It has a molecular weight of only 215, is represented by the empirical formula  $C_{10}H_9N_5O$ .

This, in turn, suggests that modifications of the kinetin molecule may be able to offset kinetin's activity, thereby preventing cell division and tissue growth. The exciting possibility is that such kinetin antagonists will destroy the disordered cell division of cancer.

**First Things First:** Right now that's strictly a hope—nothing more. Before chemists can synthesize modified kinetins, they must determine the molecular structure of the original—and that's a job that has not yet been accomplished.

Also slated for investigation is the physiological source of kinetin. The Wisconsin group—comprising botanists Folke Skoog and Carlos Miller, biochemists F. M. Strong and Malcolm von Salza—fell heir to what has been termed a "happy laboratory accident," noticed unusual behavior of a four-year-old batch of deoxyribonucleic acid (DNA): the material made cells in mature plant tissue divide like young cells.

Puzzled by this anomaly, they secured fresh DNA and tested it for growth-promoting activity. The result was negative.

They then collected old bottles of DNA from laboratories all over the Wisconsin campus, carefully screened their contents. In those bottles that had been on the shelf for long periods, they found the scarce growth factor. What happens in the bottle during the passage of time is a puzzle that is sure to get a thorough working over by researchers seeking to fit this newly won biochemical clue into the opposing patterns of normal and malignant cell growth.

**Fiber Emphasis:** Celanese Corp. of

America is planning to erect new fiber development laboratories on a 114-acre site, two miles from the company's textile division headquarters at Charlotte, N. C. The facilities will take most of the burden of fiber process development off Celanese's Summit, N.J., research center, which now carried on all the company's textile research and engineering. Applications research and technical research in the field of fibers, claims the company, will also benefit from the expansion. The first section of the new laboratory structure is expected to be functioning before the end of this year.

**Jack of All Work:** A new laboratory recorder that reportedly is "universal" in its range of uses has been developed by Fisher Scientific Co. (Pittsburgh, Pa.). According to Fisher, the instrument records any operation that produces a change in potential, current, or resistance. It plots, states the company, dc. voltage or current, resistance and temperature (from -100 to 1000 C) directly as functions of time; adapters are said to enable the machine to record pH-meter readings, polarographic curves and other data. The instrument and its electrical circuits are contained in a 6-ft.-tall cabinet. Cost: about \$1525.

**High Point:** Vital statistics of Armour Research Institute's 1954 operations, released last week, disclose that the institute performed a record \$11 million of research during the year. This, states Armour, is an 11% increase over the previous year's business volume. All told, 538 projects (of which 335 were industry sponsored) were undertaken by the nonprofit Chicago organization.

**Tailor Made:** Three new types of ready-to-use aluminum oxide absorbents for chromatography are available from Alupharm Chemicals (Elmont, N.Y.). These oxides (acid, neutral and basic), reports the company, come in standard packages and eliminate the need for preparing alumina absorbents prior to each experiment.

**Ethylene Spotter:** A new procedure for the analysis of small amounts of ethylene in ethylene-ethane mixtures has



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## RESEARCH

been developed by chemists of Canada's National Research Council (Ottawa). The method entails hydrogenating such mixtures over a nickel-kieselguhr catalyst. Samples of ethylene as small as 0.03 cc. can reputedly be determined to an accuracy of 0.5% with the new technique.

**Tagged:** Researchers of the Pfizer Therapeutic Institute (Maywood, N. J.) recently succeeded in tagging Terramycin with radioactive carbon-14. Said to be the first time this has been accomplished, the achievement makes possible the performance of tracer studies into the antibiotic's mode of action.



WIDE WORLD

### Resourceful Innovator

WILLIAM SHINN, head of the department of knitting technology at North Carolina State College School of Textiles, draws thin tube of Orlon from a special machine that fabricates substitute aortas. The device, developed by Shinn, is a modified necktie-knitter that utilizes a brass form as a "mannequin" for the Y-shaped heart artery. Finished product, which resembles an inch-wide seamless necktie, has proved successful in replacing dog aortas. If it does as well in humans, the tightly knit tube could—like the recently revealed nylon blood vessels (CW, Feb. 19, p. 68)—be readily mass produced.

# LITHIUM



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Chemical Genie of the CPI, Lithium's near-magical properties recurrently offer the key to possibilities in countless fields of research. Many of its uses were unheard of a bare year or two ago. Today, more and more scientists, researchers and development engineers are finding lithium the "open-sesame" in heretofore inaccessible areas of research.

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**CHEMICAL PLANTS:** St. Louis Park, Minnesota • Bessemer City, North Carolina • **RESEARCH LABORATORY:** St. Louis Park, Minnesota

**March 5, 1955 • Chemical Week**

## Ratio Delay: A Production Primer

### What It Is?

- It's a system of statistical control based on the law of probability.
- It can be applied to men, machines, and production streams.
- It establishes an over-all pattern from a small number of random samples.

### What It Can Do

- Enable supervisors to estimate work pace accurately.
- Provide plant managers with a running check on maintenance productivity.
- Pinpoint poor performance, increase efficiency by 40%.

### What Its Advantages Are

- Its initial costs are negligible, operational costs 67-83% less compared with continuous observation.
- It enables time-study men to cover 11 to 22 times as many maintenance workers in the same amount of time.
- It's easy to set up—if you keep this routine in mind:

#### First define your goal(s) in detail.

Foremost, usually, is a measurement of maintenance productivity to find out how low efficiency actually is. Then comes pinpointing of poor operations to discover reasons and potential corrective actions.

#### Specifically determine what information is needed.

If, for example, you want to find the reasons for low worker efficiency, you must examine all possible reasons—necessary delays such as waiting for paint to dry; unnecessary delays such as hunting for misplaced equipment; allowances for coffee breaks and personal needs; and so on.

#### Decide on rating method and make up appropriate record forms.

It is necessary to establish some sort of bench mark against which performance can be measured. One company uses the point-hour system with 60 point-hours assigned as the average daily performance. The observation record is so made out that a group of maintenance men in any one spot can be broken down and rated (e.g., out of five men, one may be working at a better than average pace, so the figure 1 would be marked, say, under the column headed 70 point-hours; two may be working at average and the figure 2 would be marked in the column headed 60; one working below average pace might be listed as 1 at 50; and if one were idle the figure 1 would be listed under 0).

#### Figure frequency and total number of observations required.

Here, experience is the best teacher, and a mathematician can be of great help. Up to a point of diminishing returns, it's advisable to have a large number of observations for greater accuracy. As for frequency, it will depend in part upon total number of observations wanted and number of observers available.

#### Establish a sampling route and random starting points.

Remember the whole idea is based on random sampling. The route part is easy but selection of starting points requires some thought. One way to do it is to make up a deck of cards with each representing a possible starting point. Every morning the deck is shuffled, and the observers each pick a card at random, which gives him his starting point for the day.

#### Use your results.

Unless the program is carried out on a continuing basis, it will be ineffective. If you decide on the point-hour system, for example, you should make observations daily, compute results (divide total number of point-hours by number of maintenance men observed), and chart this as a daily measure of maintenance productivity. Results can be extended to monthly and yearly graphs to get a better over-all view of progress, or further refined for charts on performance by shifts or by areas to pinpoint breakdowns, bring to light potential centers for improvement.

## Keeping Tabs on Time

Canadian Industries Ltd. has taken a familiar yardstick—random sampling—and tried to mark off a little-known quantity—a full day's work in maintenance. Although it's still too early for a detailed progress report, CIL's maintenance control specialist Al Smith last week had this to say about his new ruler: "It's something you can get excited about." Specialist Smith has good reason to get excited. It looks as if CIL is about

to achieve what's been for chemical companies a looked-for but elusive goal: increased efficiency of its maintenance force. In manufacturing plants today, according to *Factory* magazine,\* the average efficiency of all maintenance workers is just about half of what it should be. Chemical plants as a group are no exception. The reason: in most plants no one knows how much maintenance men

ought to be able to accomplish, nor have they ideas on how to find out.

Until recently, CIL—like most other companies—had few thoughts on the subject. But unlike most other companies, CIL believed it could find an inexpensive, workable solution. Somewhere along the line a relatively new statistical system called "ratio delay" was proposed, and the company decided it was worth a try.

**Still in Swaddles:** Ratio delay (some-

\* *Factory*, Jan. '55.

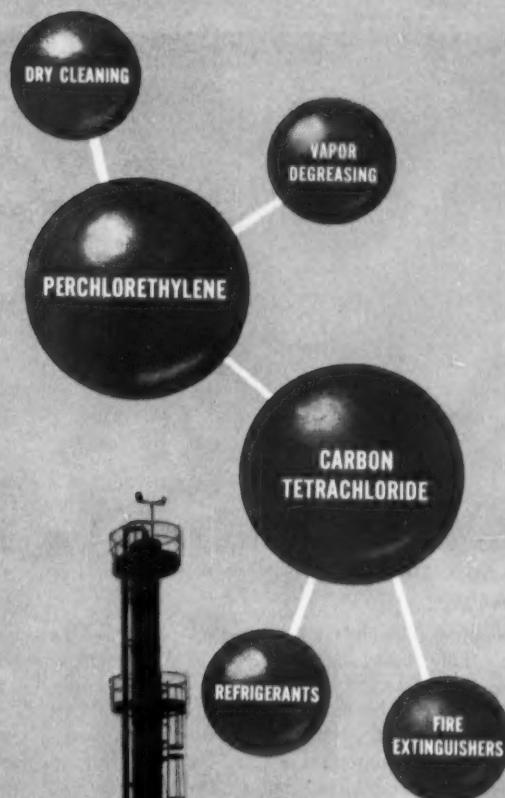


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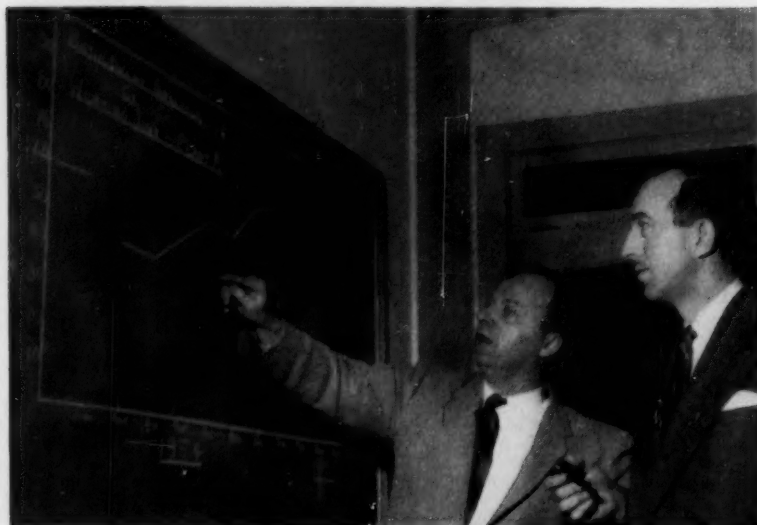
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CIL'S SMITH AND BENSON\*: A chart you can get excited about.

times referred to as work sampling) is essentially statistical quality control applied to human activity. As its name suggests, it can be used to establish the ratio of specific delays to over-all time. But more important, it provides foremen with a new diagnostic tool to help them pinpoint causes of the delays, gives them a workable yardstick for measuring maintenance productivity.

Ratio delay is based on the law of probability—with random sampling its foundation. There's nothing new or revolutionary, of course, about the idea of random sampling. As the basis for statistical quality control, it's well known to production men (*CW*, Dec. 18, '54, p. 80). Its use in obtaining operational information on machines is also a familiar one. But as a yardstick of human activity, ratio delay is still an infant.

**Animate Units:** Statistically underpinning the system, the law of probability draws upon a small (but sufficient) number of random samples to establish an over-all pattern. In earlier industrial applications, the samples were generally composed of inanimate production units, but here the worker himself is up for study. However, asserts CIL's Smith, if enough truly random observations are compiled on his activity (or inactivity), the resulting pattern will be equally valid. In a typical study, this is how it would work:

First, a rough preliminary study is

\*Joseph Benson, a CIL industrial engineer.

made. This reveals that the maintenance men are working 80% of the time. Applied to a nomograph, the figure indicates that some 400 observations are necessary for accuracy. Figuring distances that can be covered by an observer in a working day (the sampling route must cover every site where maintenance men work), the 400 is divided by the number of working days available—assume four—and then by number of available observers, say five. This means that every day for four days, each observer covers one of five routes, makes 20 random observations along the way.

He estimates how busy each of the 20 workers is, records it on his observation sheet (see p. 46: *Production Primer*—rating method). Assuming that out of the 100 daily observations 70 maintenance men are each rated at the average 60 point-hours, 20 (those that are idle) are rated at zero, 2 (the hard workers) are rated at 70 point-hours and the remaining 8 are each rated at 50 point-hours, the ratio delay coordinator totals the point-hours (in this case, 4740), divides by number of observations, and arrives at (47.40) as his performance rating for the day.

If a rough estimate is all that is desired, men can be classed merely as working and not working; and a fast (but rough) indication of productivity can be obtained by simply dividing the number of those working by the total number observed. On the other

hand, the first rating can be further refined into performance by shift, location, etc.

**At a Glance:** In any case, the rating is graphed on a daily performance chart to show the slowly emerging pattern; and, if desired, on monthly and yearly charts to show progression and longer-term trends. This daily routine is repeated for all four days.

Depending upon the degree of refinement obtained, these ratings can then be used (1) to measure over-all maintenance productivity, (2) to spot actual and potential below-average performance, and consequently (3) to boost efficiency in those over-par operations.

Obviously, as Smith points out, there are precautions that must be taken. Most important, perhaps, is the need to insure random sampling. This can be accomplished by selecting different starting points (see p. 46: *Production Primer*—sampling route) or by varying observation periods—at random, of course.

Too, unless ratio delay is carried out on a continuing basis, it will establish a valid pattern, for a specific period only. And, cautions Smith, this application is so new that no one is absolutely sure of all its workings, ramifications, or even limits. But these unknowns, far from dimming its appeal, are only whetting the enthusiasm of those experimenting with it.

CIL, of course, isn't the only company trying to rear this statistical infant. Among the other foster parents, A. E. Staley Mfg. Co. (Decatur, Ill.) is paralleling CIL's experiment, also shares its enthusiasm. For Staley, ratio delay has already boosted maintenance productivity 40%. Comparable figures are not yet available from CIL; nevertheless, maintenance man Smith declares, "To measure the productivity of a maintenance organization, it's the best thing that's come along."

**In the Running:** Work measurement itself is not new, is currently being applied in many forms. Among the systems in operation today:

- Measurement by estimates. Perhaps the most widely used, it enables supervisors to supply time estimates prior to the start of a job, is based on a comparison of actual with estimated costs. Big drawbacks are inaccuracy and inconsistency.

- Measurement by historical record

**THIS PLANT IS MAKING  
Metallurgical History**



Designed and Constructed by Chemical Construction (Inter-American) Ltd.

## **Pure Nickel by Chemical-Metallurgical Processes**

Production is underway at this new nickel refinery of Sherritt Gordon Mines Limited, Fort Saskatchewan, Alberta, Canada.

This plant combines a process for leaching nickel from Lynn Lake concentrates by using ammonia and air, and a process for precipitating the pure metal from ammoniacal solutions by using hydrogen under pressure.

### **CHEMICAL CONSTRUCTION CORPORATION**

A UNIT OF AMERICAN CYANAMID COMPANY

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# C H E M I C O







# ATLAS

CHEMICALS DEPARTMENT  
ATLAS POWDER COMPANY, WILMINGTON 99, DELAWARE  
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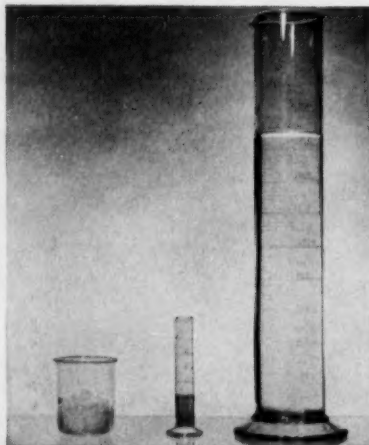
## Solving water-in-oil emulsion problems

While most emulsions are traditionally dispersions of oil in water, a sizeable array of emulsified products are the reverse; that is, dispersions of water in oil. Such products as baby oils and cream hair dressings are often water-in-oil (W/O) emulsions, and many other types of products, such as ointment bases and textile processing aids, may be either O/W or W/O. Another class of products, marine oils and rust-inhibitive oils, become W/O emulsions for all practical purposes when they are called upon in service to absorb water. In W/O emulsion products, water is held in suspension in the oil, and an unlimited amount of oil can be added without destroying the emulsion.

### Special Types of W/O Surfactants

Emulsifiers for making W/O emulsions are a special type of lipophilic (oil-loving) surfactant. They tend to be soluble or dispersible in oil, but are characterized by high water-holding or absorption capacity, as shown in the accompanying illustration. All lipophilic surfactants are not necessarily good W/O emulsifiers since not all will hold enough water.

Atlas produces a wide range of lipophilic surfactants, typified by the SPAN® and ARLACEL® groups, which are made by esterifying sorbitol anhydrides with fatty acids. On the Atlas HLB (Hydrophile-Lipophile Balance) Scale, these lipophilic emulsifiers range from 1.8 (highly lipophilic) to 8.6 (fairly lipophilic). Those having an HLB of 3 to 6 are most suitable as W/O emulsifiers. In the following table, note that SPAN 60, SPAN 80 and ARLACEL C fall into this classification. The latter two are most frequently used as W/O emulsifiers, being liquids.



This test illustrates the tremendous water-holding power of an excellent W/O emulsifier, ARLACEL C. 90 grams of petrolatum, in the beaker, plus the 10 cc. of ARLACEL C, in the small graduate, will absorb and hold as much as 1660 cc. of water. As shown at right, a thick, creamy emulsion is formed as viscosity increases, until the point of inversion is reached.



Name	Compound	HLB Value
SPAN 20	sorbitan monolaurate	8.6
SPAN 40	sorbitan monopalmitate	6.7
SPAN 60	sorbitan monostearate	4.7
SPAN 65	sorbitan tristearate	2.1
SPAN 80	sorbitan monooleate	4.3
SPAN 85	sorbitan trioleate	1.8
ARLACEL C	sorbitan sesquioleate	3.7

It is interesting to note that the degree of lipophilic tendency (and, in general, the oil-solubility) is determined by the length of the fatty acid chain. For example, the 18-carbon stearic and oleic chains give a lower HLB (more lipophilic tendency) than the 16-carbon palmitic, while the 12-carbon lauric gives the least lipophilic derivatives. Similarly, tri-esters are more lipophilic than mono-esters.

The two most used W/O emulsifiers, SPAN 80 and ARLACEL C, differ in their solubility characteristics, SPAN 80 being more readily and wholly soluble in water, for example. ARLACEL C is widely accepted as the outstanding W/O emulsifier for cos-

metic and pharmaceutical use, while SPAN 80 is one of the most versatile of all emulsifiers in general industrial applications of a water-in-oil emulsion character, such as dry-cleaning detergent compounds and anti-corrosion oils, in addition to cosmetics.

The other surfactants of the SPAN group provide a wide range of oil-solubilities, and are principally used in blends with various Atlas water-soluble surfactants to obtain the desired Hydrophile-Lipophile Balance for any emulsion problem. They are thus used not only in cosmetic and pharmaceutical formulations, but also in polishes, cutting oils, cleaning compounds and textile assistants, as well as many other emulsion products, both O/W and W/O.

We'll be glad to send you literature about the extensive family of Atlas emulsifiers, and to lend assistance in applying them to your specific problems.



## Atlas test methods aid selection of agricultural emulsifiers

Manufacturers of emulsifiable concentrates of insecticides and herbicides must know exactly how their products will perform under field conditions. Laboratory test methods, however, may fail to produce the proper answers . . . either because they do not duplicate field conditions, or because lack of standardized techniques makes materials look good in one laboratory but fail miserably in another.

Atlas emulsion chemists have devised both techniques and equipment for testing these emulsions—delivering standard, reproducible results, all based on practical field conditions. Agitation, for example, is done on a motor-driven "shaking table," instead of being left to the mercy of the lab man's arm. The emulsion viewer simplifies the determination of the amount of separation which occurs at any predetermined time interval, providing a reproducible stabilizing record on the formulation under test.

All of Atlas tests are conducted in water hardnesses which will be met in the field, using water samples ranging from 50 ppm to 1000 ppm. Accelerated aging tests are used, to insure against corrosion of the drums or loss of efficiency. Dilution rates tested are those recommended for the formulation by the producer. Bloom, of course, is always considered. However, bloom is not gained at the cost of loss of stability.

Formulators are finding out that standardized, practical testing pays off. By carefully outlining the complete conditions under which they want their concentrate to hold up, and then using standard reproducible tests in their own labs to find the proper emulsifier, they are getting better concentrates, lower costs, and, often, a partial solution to their inventory problems.

Technical papers on the test methods used at Atlas are available for the asking.

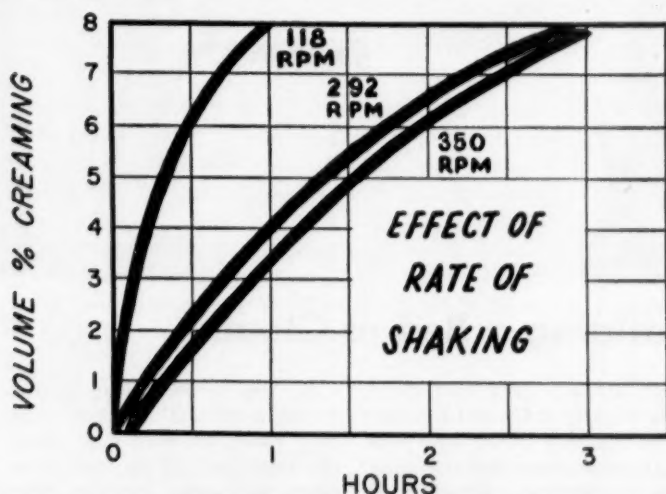


Chart shows how the rate of shaking affects the creaming rate of an emulsion . . . proving the need for standardization of test methods.

## Water-blocked oil wells stimulated by ATPET® 931

Oil wells which are subject to damage by water can be restored to full production or completed at higher rates of productivity, by means of a new method of stimulation using ATPET 931. This unique chemical developed by Atlas has the ability to reduce interfacial tension between oil and water practically to zero. By injecting crude oil containing about 1% of this material into an oil well, the water in the oil-bearing stratum is made to mix freely with oil, and normal flow of oil is restored.

Extensive field experience with the ATPET 931 treatment proves it valuable in bringing in new wells and in conjunction with other methods of well stimulation or repair. Because of its exceptionally economical cost, this treatment pays for itself in days instead of months. For information on the material and the results that have been obtained using it, write or call Atlas today.

## Investigate sorbitol for making paint resins



Oil-modified alkyd resins for paints and varnishes can be given improved qualities by using sorbitol as 40 to 50 percent of the polyol constituent. Films have greater toughness, and dry or bake faster. Resin esters for lacquers or varnishes can also be made using sorbitol. A wide range of characteristics is possible.

In all these resins, the use of sorbitol achieves considerable economy. Sorbitol's low, stable price cuts total polyol cost, and its ready availability assures good supply and delivery. If you'd like further data on using sorbitol for this purpose, write for a copy of the booklet "Sorbitol Resins." It contains specific formulas for a number of sorbitol-based resins, with complete instructions for preparation.

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## PRODUCTION . . . . .

analyses and average past performances to obtain standards for current performances. Again, the system is inaccurate, makes it difficult to change standards as methods change.

• Measurement by standard time data. STD makes use of time study, applies derived standards to each component of a job, adds allowances for different circumstances, and sets up the resultant sum, as a standard against which performance is measured. This system, although popular with some companies (e.g., Du Pont) is relatively expensive, requires trained job analysts and many hours of observation.

Ratio delay, on the other hand, avoids many of the drawbacks, retains most of the advantages of the other systems. It is simple, inexpensive to administer, says Smith, and gives a valid picture. Staley's William Jaske adds: "Ratio delay has enabled us to expand output 10% while keeping the size of our maintenance force constant. At the same time, maintenance productivity has risen 40% and mechanical breakdowns have dropped 50%."

•

## EQUIPMENT . . . . .

**Micro Pump:** A calibrated handset dial provides precise control of fluids metered by Lapp Insulator Co.'s (LeRoy, N.Y.) Microflo Pulsafeeder pump. Requiring no packing or running seal, the piston-diaphragm pump design eliminates the possibility of leakage or contamination of sealed-in fluid, permits regulation in infinite increments from zero to full capacity of 2400 ml./hour.

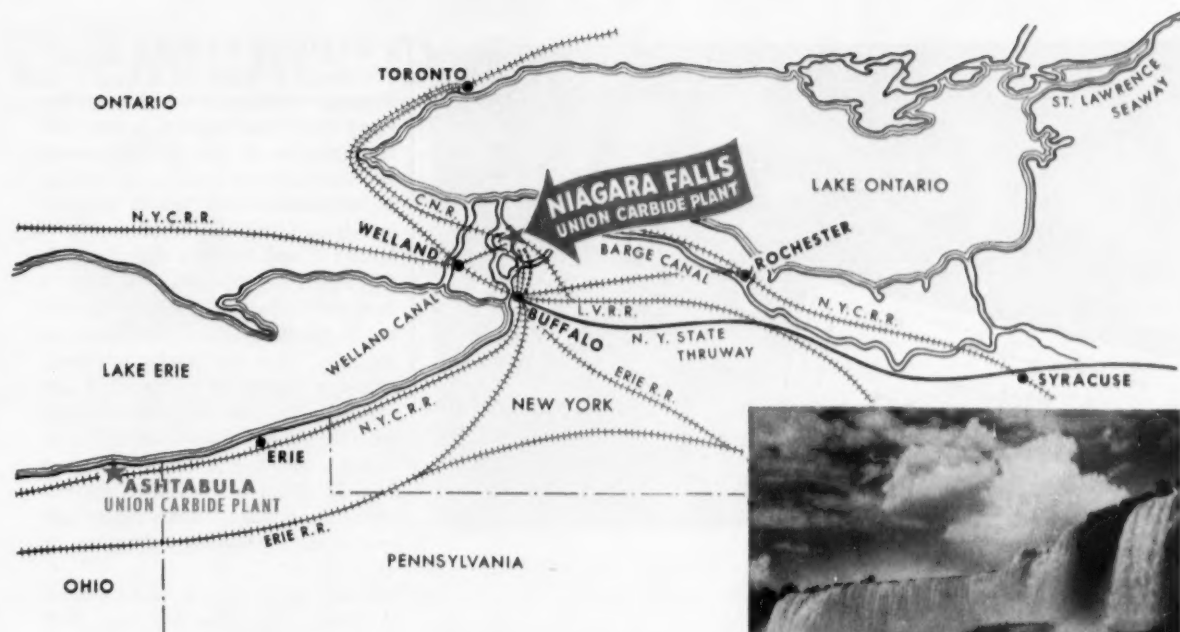
•  
**Plug Shooter:** No easy job, cleaning inside of narrow-diameter condenser tubes is a problem that calls for imaginative solutions. The latest: Blo-Gun cleaner, which Thomas C. Wilson, Inc. (Long Island City, N.Y.) has added to its line of condenser assembly and maintenance tools. Lightweight, the gun has an aluminum



## Building a Bed of Clouds

UNBOXING a glass fiber cloud, these workers at General Electric's Hanford Atomic Project have more than scenic decoration in mind. They are building a glass fiber filter bed that will eventually measure

7 ft. deep by 56 ft. long. Said to be more efficient and less costly than older, alternate sand filters, this huge bed will be used to remove radioactive particles from process exhaust gases at Hanford.



## Acetylene Available By Pipe Line at Niagara Falls

Acetylene for chemical synthesis is "on tap" in the Niagara Falls area. This important chemical raw material can be supplied in any volume *by pipe line*. You do not need any acetylene generation equipment at your plant.

**Acetylene Experience.** For many years acetylene made from UNION CARBIDE has been piped to nearby users at Niagara Falls. Acetylene can now be piped safely and economically for many miles. Since UNION CARBIDE has been produced at Niagara Falls since 1898, a wealth of experience in acetylene generation and handling is available to you.

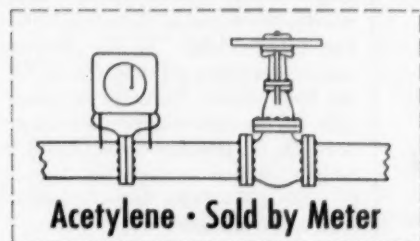
**Convenient Plant Sites.** Niagara Falls is an excellent location for new plants, with a number of desirable industrial plant sites within piping distance for LINDE's volume acetylene service. It is an established chemical center. Your plant will be close to industries producing other chemicals, which include hydrogen, chlorine, hydrogen chloride, sodium metal, caustic soda, lime slurry, and dry lime hydrate. Many

of these chemicals can also be supplied by pipe line.


**Excellent Transportation.** Plants in Niagara Falls have other advantages. Dependable electric power is available. Transportation facilities are excellent. Consider these facts: (1) served by three trunk line railroads; (2) accessible to the Great Lakes, the New York State Barge Canal, and the projected St. Lawrence Seaway; (3) located on the planned extension of the New York State Thruway; and (4) the natural gateway to nearby industrial areas of Canada.

UNION CARBIDE is also produced at Ashtabula, Ohio; Sault Ste. Marie, Michigan; and Portland, Oregon. Bulk shipments to chemical users can be made from any of these plants, including Niagara Falls. Drum stocks for industrial users are maintained at 111 warehouses throughout the United States.

Telephone or write your requirements to LINDE's CARBIDE-ACETYLENE DEPARTMENT for technical and sales information.



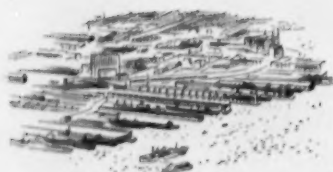
### LINDE AIR PRODUCTS COMPANY

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With direct rail-ship cargo transfer, one of the largest privately-owned railroad Marine terminals in the world . . . B&O's Locust Point Marine Terminal . . . offers unsurpassed modern facilities.



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Abundant electric power at economical industrial rates. The Wagner Station—"on-line" in 1956—with other plants of the interconnected system means more than 2,000,000 kilowatts . . . Natural gas, too, is available.

**THIS IS MARLEY NECK**—at Baltimore! This air-view only *suggests* the vast size and unusual features of this deepwater site for *your* new *seaboard plant*!

No big grading jobs here . . . no property acquisition delays . . . mild all-year climate . . . nowhere in this nation does MODERN ZONING afford better plant protection . . . POWER is plentiful . . . RAIL TRANSPORTATION of B&O's high standards.

*The B&O, The Consolidated Gas Electric Light and Power Company, and Anne Arundel County are ready and eager to help put your plant 'into the picture' at Marley Neck.*

Come see this site! If you can't view it personally, we'll show it to you *at your desk*, in 3-dimensional color! *Ask our man!* You can reach him at:

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## **Baltimore & Ohio Railroad**

**Those who KNOW use B&O!**  
**Constantly doing things—better!**

## **PRODUCTION . . .**

housing with a removable rubber spray shield and tapered bronze nozzle, operates on water or compressed air. This is how it works: Ammunition is first selected from among the various sizes of plug and brush projectiles furnished with the gun and placed in the condenser tube. The Blo-Gun is then inserted up to where its tapered nozzle fits flush against the mouth of the tube. Then the trigger is pulled, releasing water or compressed air, which propels the projectile through the tube in less than a second, it is claimed, cleaning away soft surface deposits ahead of it. Unlike conventional ammunition, both plugs and brushes can be used repeatedly.

**Pipeline Mixer:** Mixing tanks can be eliminated, says The American Well Works (Aurora, Ill.), by the use of its Homomix pipeline blender. Forming a part of the influent piping, the Homomix provides instantaneous diffusion of liquid, gas, or slurry additives into the base fluid at the point of entry. Diffusing impellers rotate in a blending chamber, discharge mixed additives directly across the flow-through stream. Operable in vertical, horizontal, or inclined positions, units are available in one or more stages for capacities ranging from 1 to 10,000 gpm.

**PVC Laminate:** Vyflex FL-85 lining material, developed by Kaykor Industries, Inc. (Yardville, N.J.), combines features of two types of plastic: a backing layer of plasticized PVC provides flexibility and ease of bonding to concrete, steel, or wood; while a surface layer of unplasticized PVC affords high corrosion resistance without danger of contamination from plasticizers or modifiers. Requiring no curing, FL-85 is suitable for service with a broad range of acids, alkalis, and organic compounds at temperatures to 200 F.

**Plastic Nozzles:** The "TF" series of long-wearing, nonclogging spray nozzles developed by Bete Fog Nozzle Inc. (Greenfield, Mass.) features unique one-piece construction of Teflon fluoroplastic. Resistant to practically any sprayed solution, nozzles are available for five flow rates from 5 to 50 gpm., in narrow-angle (50 degree) or wide-angle (120 degree) hollow-cone spray patterns.





**NEW  
REINFORCING  
AGENT FOR  
WHITE  
SIDEWALL  
RUBBER  
STOCKS**

This news bulletin about Wyandotte Chemicals services, products, and their applications, is published to help keep you posted. Perhaps you will want to route these and subsequent facts to interested members of your organization. Additional information and trial quantities of Wyandotte products are available upon request . . . may we serve you?

White-sidewall tire and similar rubber stocks have been developed in our laboratory, using Purecal\* SC as a reinforcing agent, which duplicates the physical properties found in stocks made with zinc oxide. Many properties, such as resistance to color changes upon aging, were proved to be superior to those of stocks made with zinc oxide.

Purecal SC is Wyandotte's new coated ultrafine Calcium Carbonate. It disperses readily, and is entirely different from any other coated Calcium Carbonate on the market.

The unique organic coating on Purecal SC does not retard cures. It neither impairs the excellent aging characteristics of the ultrafine Carbonate, nor affects the color. It does not reduce resilience, lower modulus, or increase heat build-up.

**REPLACES  
ZINC  
OXIDE**

The Purecal SC, used in place of zinc oxide for reinforcing white-sidewall tire and similar rubber stock, affords good resistance to sunchecking, longitudinal and radial flex-cracking.

**PROMISES  
LOWER  
COSTS**

Due to the much lower cost of Wyandotte Purecal, important savings are possible in this area of rubber making. Results to date would indicate that white-sidewall stock made with Purecal SC warrants thorough evaluation in your laboratories.

**WHERE TO  
GET IT:**

Samples and further information, including suggested sidewall formulations using pale crepe, pale crepe neoprene GN, pale crepe GR-S 1502 with accompanying physical properties, are available.

Technical assistance, or the services of our rubber compounding laboratory, will be open to you upon application.

In writing, please give us sufficient information on the manner in which you are going to use Purecal SC, to enable us to give you as much needed technical data as possible.

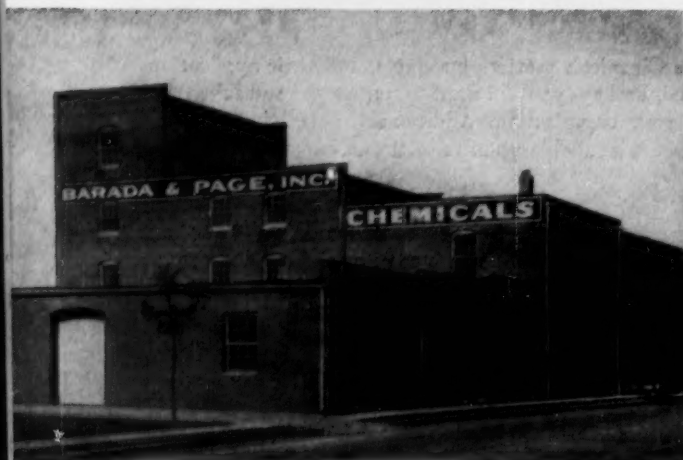
\*REG. U.S. PAT. OFF.



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CHLORINATED SOLVENTS • AGRICULTURAL CHEMICALS AND INSECTICIDES • OTHER ORGANIC AND INORGANIC CHEMICALS

# DISTRIBUTION . . . . .



**CHEMICAL NETWORK:** Home-based at Kansas City (left), branched at Wichita (right) and elsewhere, B&P now covers 19 states.

## Chemical Department Store

Over the past few years, manufacturer-distributor relations in chemical selling has been an off-again, on-again engagement. The manufacturers have alternately waxed cordial and cold; they have sold direct, through distributors, and back again. But now, if recent events are any gauge, the producer, once more "wanting out" of the small shipment, final user business, seems more inclined to cooperate than compete for less-than-carload sales.

Stirrings at Guinotte and Michigan Avenues in Kansas City, Mo., are bearing out this trend. Home base for Barada & Page, Inc., its activity is radiating fresh confidence that this 45-year-old chemicals distributor is about to enter a new growth phase.

Two indications:

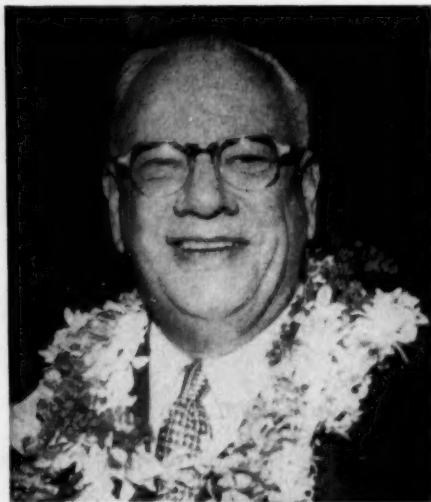
- Reports of just-leased building to be operated as a new branch in Odessa, Tex.

- A new, custom-designed chlorine filling station in St. Louis, ready to go onstream late this month.

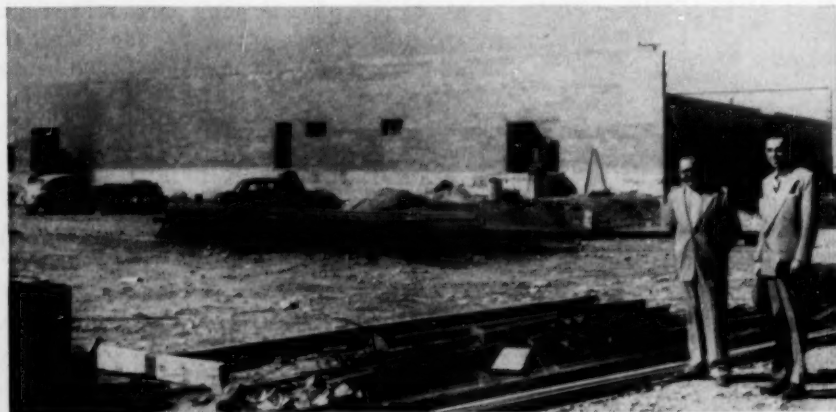
This second event is the direct result of a manufacturer-to-distributor transfer of chemical distribution business. In May last year, Monsanto Chemical came to an agreement whereby B&P took over Monsanto's liquid chlorine cylinder work. Until B&P's chlorine filling plant is completed, Monsanto is continuing to fill the cylinders.

Also indicative of B&P's activity: its recent purchase and assumption of Du Pont's "National" anhydrous ammonia cylinder business. Like the Monsanto switchover, Du Pont's decision came after years of manufacturer-run distribution. In this case, the trademark National, now licensed to B&P, has been known to the trade for 70 years.

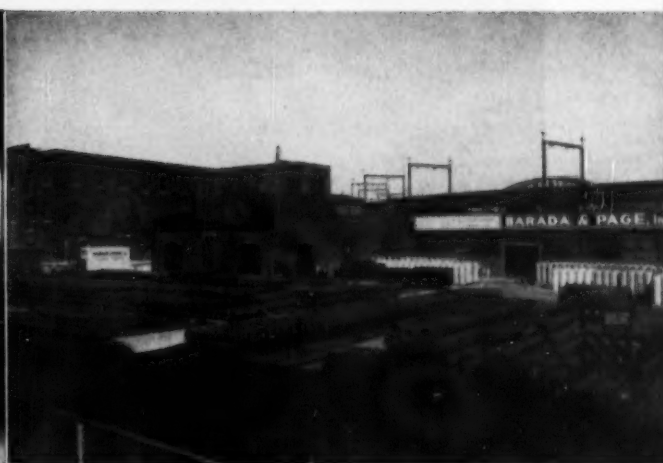
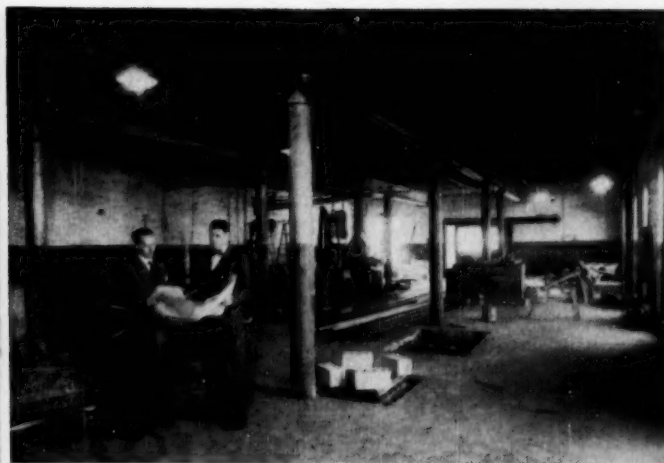
**What It Takes:** Prior to taking over the Du Pont facilities, B&P coverage ranged over 7 states (Missouri, Kansas, Oklahoma, Arkansas, Texas, Louisiana, Mississippi), parts of 3 others. With the ammonia work, 12 new states are added: Indiana, Ohio, Kentucky, Tennessee, Michigan, Wisconsin,



**BETTS:** Buyers no longer come to call, but manufacturers are 'coming around.'



**ODESSA OUTPOST:** Oil and gas producers take, as well as make, chemicals.



**ST. LOUIS STATION:** New chlorine filling center transfers cylinder business, and headaches, out of producer's hands.

sin, Minnesota, Iowa, Colorado, Utah, Alabama, Florida.

In addition, B&P sells a self-made product, an anticrack tablet for ice makers, as far away as Hawaii.

An operation the size of B&P's requires a good deal more than a supply of order books and a desire to please. According to President Walter Betts, container requirements alone mount to these totals:

- 10,000, 150-lb. size plus 250 one-ton chlorine cylinders.
- Approximately 10,000, 50-, 100-, and 150-lb. ammonia cylinders.
- About 8000 carboys, 5000 regular and special drums and 150,000 gal. total storage capacity.

And in addition to container capacity, there's the vitally important matter of supply lines.

**Delivery Problem:** In order to function profitably in these days of high freight rates, B&P, Betts points out, has been operating its own fleet of over-the-road trucks and trailers.

"High freight rates have necessarily made it important that we do a substantial amount of our own transportation, especially from manufacturing plants that are located within the confines of our regular trade territory," he observes.

B&P's fleet of 20, ranging from city delivery trucks to tractors and trailers, travels 600,000 miles annually.

**Change of Pace:** Chemical selling has come a long way since that day back in 1917 when Betts joined the company, then known as Page-Love Chemical.

"In those days," he reminisced, "all

deliveries were made by horse and wagon. But more significantly, the buyer more or less came to the seller. Furthermore, this was all virgin territory; manufacturers could not possibly work and cover it, and were anxious to have distributors."

**Milk and Cream:** Despite the present-day squeeze between hiked freight rates and stepped-up delivery demands, Betts sees a rosier future for the distributor. True, he concedes, as rates rise, the distributor, even as the manufacturer, must concentrate on the centers of industry and population, thus somewhat hobbling his stock in trade to "supply the right chemical at the right price and quickly."

But as specialists in distribution, Betts is confident that his company's position is now coming full circle.

"Formerly," avers Betts, "it was understood that we could not do too good a job, for fear of making the manufacturer jealous; now, however, we cement ourselves with sales-minded manufacturers."

"We view ourselves," he pictures, "as virtually a department store for industrial chemicals. We feel that, in acknowledging our position as such, the average manufacturer is no longer jealous of our making a profit."

"On the contrary, the producer is beginning to recognize the distributor's place in this chemical business; he is beginning to concede that in less than carload sales, the distributor needs a little cream with the milk."



**DISTRIBUTION LIFELINES:** One way to beat the freight: roll your own.



FOR COMFORT: Purchasing-conscious audience 3-Ds Colombian's facilities.

## Selling by 3-D

Into the acoustic-tiled conference chamber of Colombian Carbon Co.'s Manhattan office last week hurried the Manufacturing Chemists' Assn.'s public relations committee. After a routine business meeting, they donned polaroid glasses, settled back for the latest showing of the firm's stereoscopic sales film, "Smokeless Carbon Black Production."

Columbian has gotten plenty of mileage out of its slick, yet homemade, sales films. "Smokeless," for example, though originally designed to tell customers about the company, has now been seen by stockholders, schools, civic organizations and various industrial groups. Principal purpose: to sell viewers on Colombian by giving them a behind-the-scenes "tour" of the company's production and research facilities.

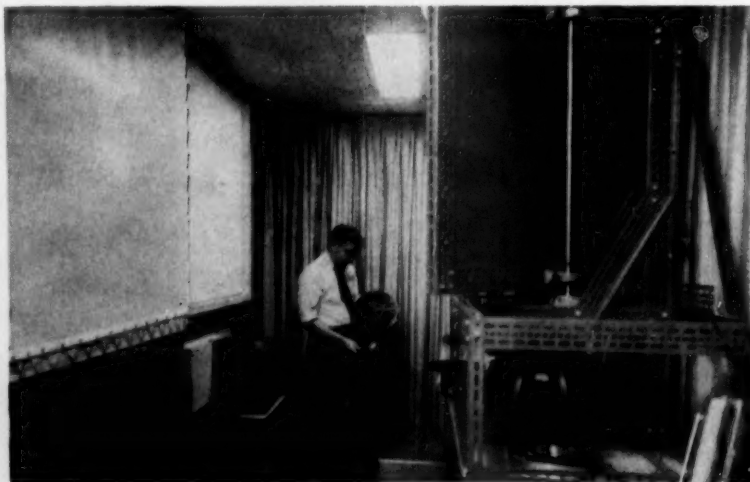
Carbon black companies have, of course, a particular problem. It isn't easy to conduct plant visits. Take a prospect into the plant and you risk soiling his clothes. Give him protective clothing and you make him uncomfortable in operating furnace areas. Shut down the plant and you lose money. So previously, unless a plant tour was absolutely imperative, prospective customers were simply steered to a hearty dinner and a good show.

By filming operations during normal shutdowns, splicing in "record" shots, and adding "clips" necessary for continuity, the firm can now show customers its production equipment and

and loading facilities, and give them glimpses of development, research, and sales service with all the standard 3-D tricks. Other sequences portray practices promoting community goodwill, e.g., steam instead of smoke being vented to the atmosphere. Magnetic soundtracks (which are erasable) key the film to the particular audience.

Economy and "the communication barrier" are the reasons why Colombian makes its own movies. It's the company's belief that its own scientists\* have a clearer concept of what

\* Research physicist Bill Ladd (also an amateur photographer) supervised "Smokeless."



FOR SHOWMANSHIP: One of many, this gadget helps rear projection.

interests customers' technical personnel. When professional studios are used, costly refilming is sometimes necessary because those studios are prone to slant technical films to the layman.

"Smokeless," however, is only one of several homemade films. Over the years, Colombian has made them for:

- Sales promotion: "Liquid Oxygen Explosives" (in 3-D).
- Internal training: "Dispersion of Carbon Black in Master Batches" and "Determining the pH Effect of Carbon" (aimed at bridging the communication gap between patent lawyers and researchers).

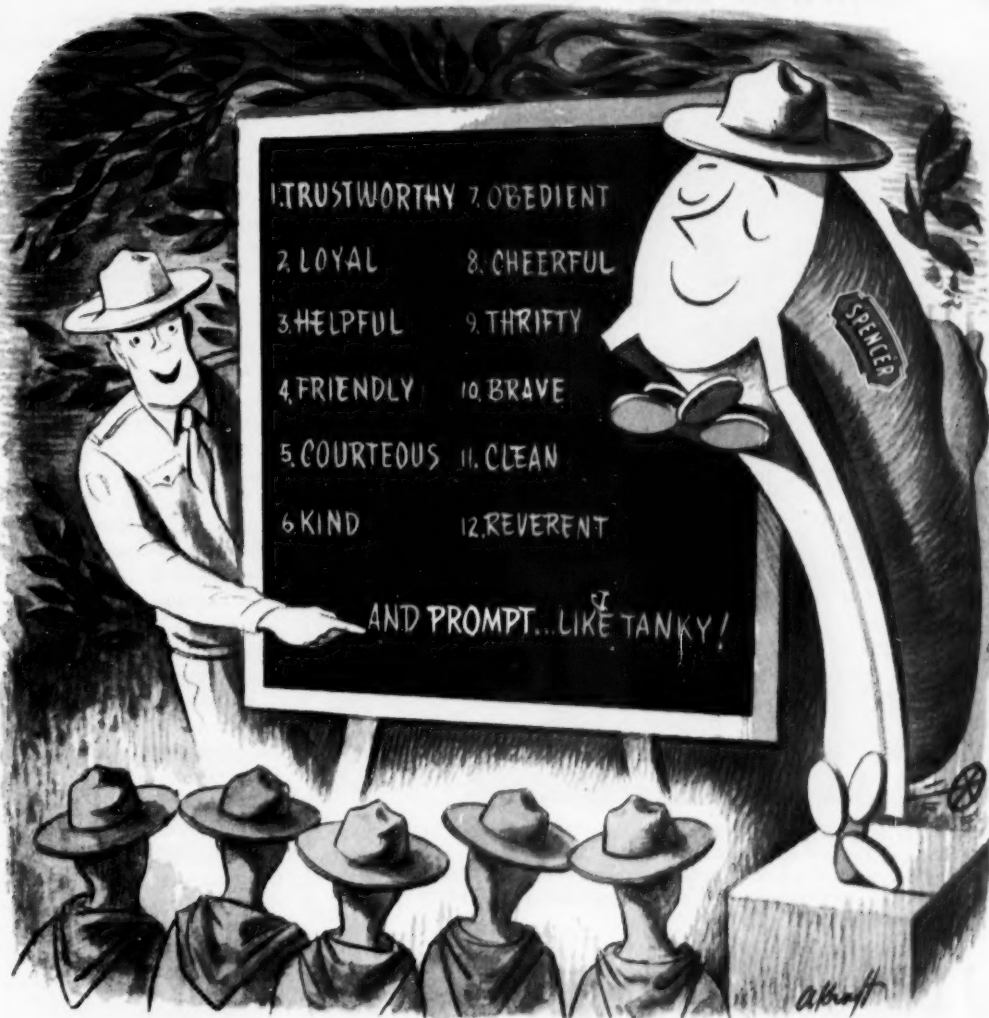
- Public relations: "Reading, Riting, and Riding With Carbon" (addressed to the layman, in this case, shows how carbon is used in everyday life).

Alert to the public relations value, Colombian likes to screen its films in its New York office whenever possible. On the walls are rear-lighted color transparencies of company operations and stereophotomicrographs of carbon blacks. Paneling in wall recesses roll out to become tables. Behind the speaker's platform (which can be spotlighted) is a storeroom containing special rear-projection equipment (*see bottom cut*).

The company is sold on the worth of sales films. More will be made as the need arises, and though the firm thinks the 3-D novelty is wearing off, Colombian will use whatever techniques satisfy its penchant for hard-selling showmanship.



# Spencer Service is Wonderful



**Meet the creator of Tanky**—Arthur Kraft of Kansas City, who has been drawing our Tanky cartoons since 1953. This year the U. S. Junior Chamber of Commerce selected Art Kraft as one of the Ten Outstanding Young Men of the Nation. In this way, he was recognized as one of America's outstanding painters and sculptors. Having worked with him, Spencer is proud of Arthur Kraft and Art's art.



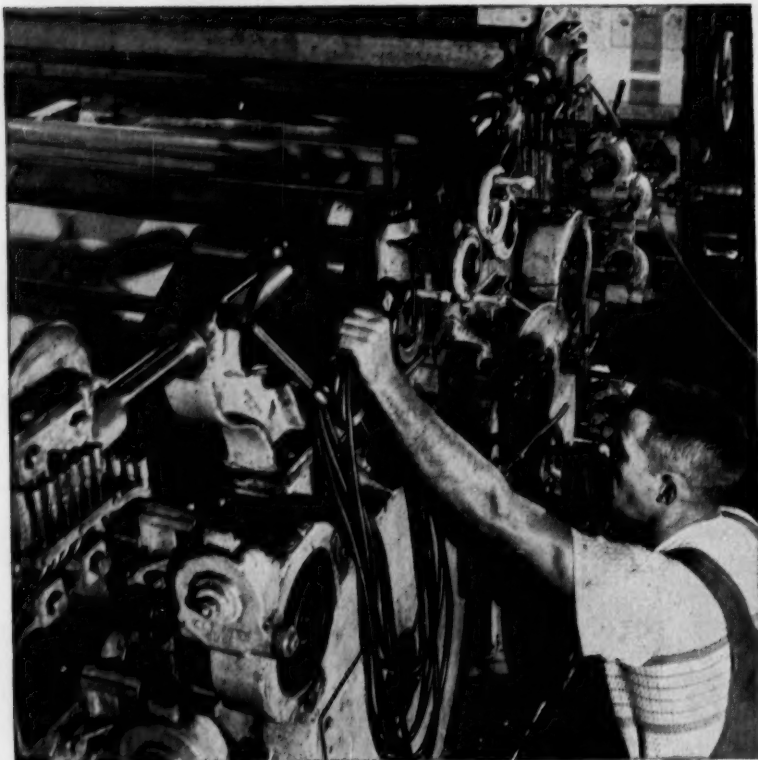
*America's Growing Name In Chemicals*

**SPENCER PRODUCTS:** "Poly-Eth" Polyethylene • Ammonia (Commercial and Refrigeration Grade) • Aqua Ammonia • 83% Ammonium Nitrate Solution • Synthetic Methanol • Formaldehyde • Hexamine • "Mr. N" Ammonium Nitrate Fertilizer • SPENSOL (Spencer Nitrogen Solutions) FREEZALL (Spencer Dry Ice) • Cylinder Ammonia

## SPENCER CHEMICAL COMPANY

**GENERAL OFFICES:** Dwight Bldg., Kansas City, Mo. **DISTRICT SALES OFFICES:** 500 Fifth Ave., New York City; First National Bank Bldg., Chicago, Ill.; Candler Bldg., Atlanta, Ga.; Union Planters National Bank Bldg., Memphis, Tenn.

## How Bemis makes GOOD multiwall bags for you



*As with other types of printing, there is no substitute for experience in multiwall paper bag printing. A typical Bemis pressman is Wesley Pitcher, shown here at the 4-color press he operates at the Bemis plant in Peoria. Wesley went to work in the printing department 21 years ago and has been a pressman for 18 years.*

## Good bag printing requires three things... and Bemis has 'em!

Good multiwall bag printing... the kind that makes your brand a star salesman... requires good presses, good plates and good workmen. And Bemis has 'em!

1. Specially designed presses... with features needed for best multiwall printing... are used.
2. Our own skilled, experienced plate makers make our printing plates... so we control quality every inch of the way.
3. Since we have been making and printing quality multiwalls for twenty-seven years, we have trained our pressmen to the point that they do, day in and day out, the best printing in the bag industry.

# Bemis



General Offices—St. Louis 2, Mo.  
Sales Offices in Principal Cities

## DISTRIBUTION . . .

**New Address:** Westco Chemicals, Inc., wholesalers and surplus chemical dealers, is now occupying consolidated offices and warehouses in North Hollywood, Calif.

**Distributor Appointments:** Sealube Co. (Wakefield, Mass.) has named Livingston Coating Corp. (Charlotte, N.C.) to distribute corrosion-resistant materials throughout Virginia, North Carolina, South Carolina, Tennessee, Georgia, Alabama and Florida.

- Hercules Powder Co. (Wilmington) has selected Denver Fire Clay Co. (Denver, Colo.) to sell naval stores.

- Prentiss Drug & Chemical Co., Inc. has appointed Frank E. Dempsey & Co. (Toronto) as Canadian distributor for its line of pesticides and botanicals.

- Pacific Vegetable Oil Co. has appointed R. B. Huber (Boston) to distribute industrial oils in the New England area.

- Raymond Laboratories (St. Paul) has named M. H. Baker Co. (Minneapolis) as national sales agency for raw cosmetic materials.

- Lehigh Chemical Products Co. (Chestertown, Md.) has designated two new sales agents to handle synthetic lubricants: Industrionics, Inc. (Newton Highlands, Mass.) and Edco Sales Co. (Upper Darby, Pa.).

- Minerals Processing Co. (La Grange, Ga.) has named Roger G. Brown (Macon, Ga.) exclusive agents for the firm's mica minerals.

- Northport Co. (St. Paul) is now representing General Ceramics Corp. in North and South Dakota, Minnesota and northern Wisconsin.

**For Your Reference:** Crystalline ammonium nitrate fertilizer is the subject of a just-issued technical data sheet. Includes product description, recommended application, handling, shipping and storage information. Commercial Solvents Corp., New York.

- Vanadia oxidation catalyst—technical data sheets furnishing information about physical properties, chemical composition, applications and effectiveness. Davison Chemical Co., Baltimore.

- Glass-reinforced plastics molding—booklet discusses merits, applications, and physical properties of high-pressure and matched-metal die low pressure molding methods. American Hard Rubber Co., New York.

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Uniform quality . . . The key to the superior Chemicals for industry produced by the Tennessee Corporation. As basic producers, we maintain exacting quality control from the raw materials to the finished product that bears our label.

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### MONOHYDRATED COPPER SULPHATE

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### COPPER HYDRATE

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### CUPRIC OXIDE



## MANGANESE SULPHATE

### MONOHYDRATED MANGANESE SULPHATE

### MANGANOUS OXIDE

### MANGANESE CARBONATE



## FERRIC SULPHATE

### SULPHUR DIOXIDE

### MONOHYDRATED ZINC SULPHATE

### CHLOROSULPHONIC ACID

### ORGANIC SULPHONIC ACIDS ( & DERIVATIVES )

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Available Upon Request.*

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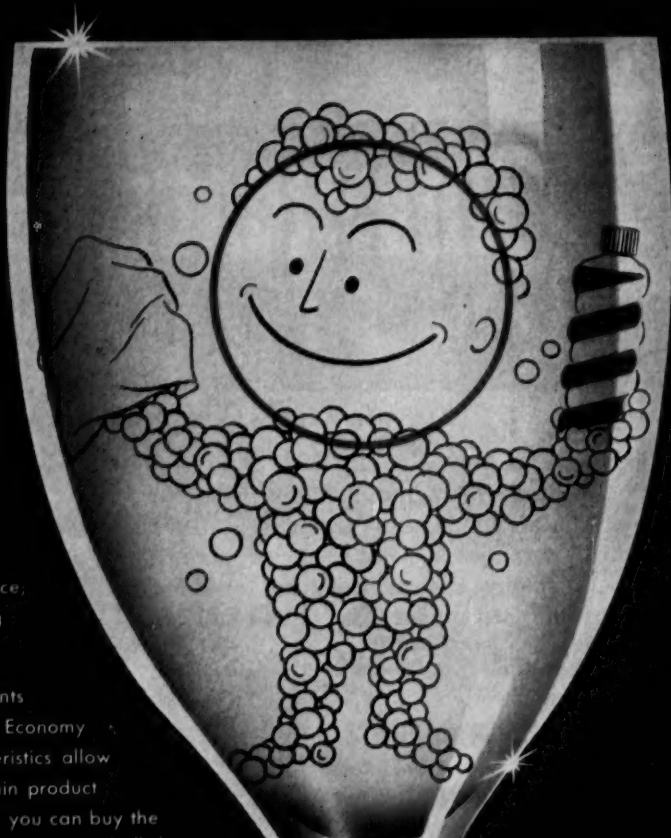
# Suds Shines and SLEETS

The growing preference for liquid detergent formulations is showing up in the sales picture... last year there was a phenomenal 90% industry wide increase in these sales.

And no wonder... liquid detergent formulations offer real economy; instant solubility in any water; a pleasing fragrance; sneeze-free washing; dishes that dry shining bright; no sink scum to scrub away.

Many of today's best-selling liquid detergents are formulated with Atlantic ULTRAWETS. Economy is one reason. High performance characteristics allow a saving on the quantity needed to maintain product efficiency. Add to this saving a further one: you can buy the ULTRAWETS at significantly low prices in tank car or bulk lots.

Ask us for detailed information on the ULTRAWETS. Our Chemical Products Sales Division can supply formulations, or help you develop your own. Write, wire, phone or send the coupon today.



The ULTRAWETS wet, penetrate, clean and emulsify.

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## THE ATLANTIC REFINING COMPANY

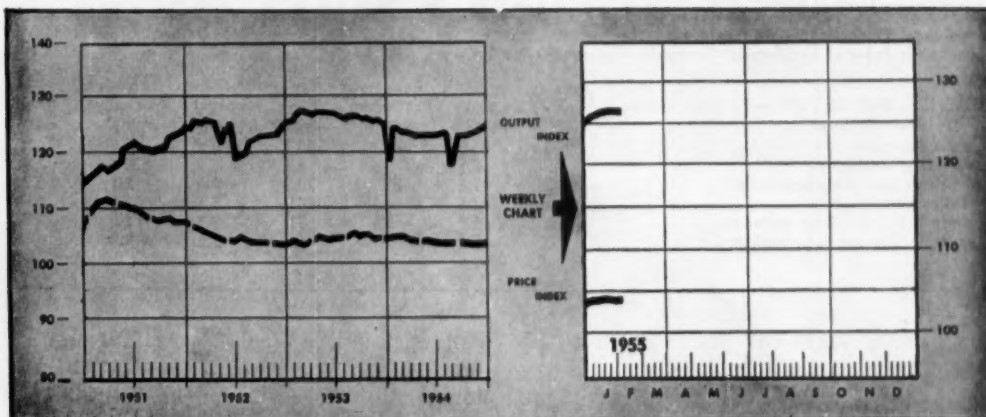
Dept. H-3, Chemical Products Sales  
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# MARKETS . . . . .



CW Index of Chemical Output—Basis: Total Man Hours Worked in Selected Chemical Industries  
CW Price Index—Basis: Weekly Prices of Sixteen Selected Chemicals

## MARKET LETTER

Naphthalene movements continue at a lively pace. Domestic producers, for example, report that demand—especially from phthalic anhydride makers—is holding up very well. Calls from other naphthalene derivative users, too, have not slackened.

The briskness in business is also evident in imported, hot-pressed material. There isn't a great deal of the foreign 78° material around, and this dearth has just about erased the lower end of the 5¾-6¢/lb. price range that has been prevailing.

But while some naphthalene sellers insist that they could sell more if they had more, others are more soberly eyeing the factors behind the surge in buying, pondering the possibility of a letup.

Biggest part of the push stems from the heavy demand for phthalic anhydride. Most consumers, of course, are getting all the phthalic they need to meet production schedules, but many are buying extra to build up inventories. The time—perhaps not too far off (*CW Market Letter*, Feb. 12)—when such stocks are adjusted to higher operational rates and purchases level off, is the cloud in today's otherwise bright naphthalene picture.

Some iodide boosts, long expected, arrived late last week. Among the major items marked up, by 25¢: potassium iodide, mixtures, and sodium iodide. Resublimed iodine tags, too, were raised.

The increases, in effect, mirror the jump in crude iodine prices posted last November. The 30¢/lb. advance at that time was a move by Chilean iodine sellers to readjust from an earlier drastic cut reportedly made to drive lower-priced Japanese material off the market. It was apparently a fruitless strategy, for Japanese crude is still being offered at prices slightly under both Chilean and domestic crude.

On the whole, however, demand for the crude has been and is steady.

Competition in a different area is tagged as one cause of this week's lower polyvinyl acetate emulsion prices. The 1½¢/lb. cut—which

# MARKET LETTER

## WEEKLY BUSINESS INDICATORS

	Latest Week	Preceding Week	Year Ago
CHEMICAL WEEK Output Index (1947 =100)	127.0	126.4	123.4
CHEMICAL WEEK Wholesale Price Index (1947=100)	104.2	104.4	104.6
Bituminous Coal Production (daily average, 1000 tons)	1481.0	1448.0	1208.0
Steel Ingot Production (1000 tons)	2172.0 (est.)	2191.0 (act.)	1686.0
Stock Price Index of 13 Chemical Companies (Standard & Poor's Corp.)	382.4	382.0	265.1

## MONTHLY INDICATORS—Foreign Trade (Million Dollars)

	Latest Month	Exports Preceding Month	Year Ago	Latest Month	Imports Preceding Month	Year Ago
Chemicals, total	86.0	86.1	82.3	20.6	17.6	21.9
Coal tar products	7.5	6.6	6.1	3.9	2.6	2.6
Medicinals and pharmaceuticals	19.8	20.2	20.5	0.4	0.5	0.7
Industrial chemicals	12.5	13.1	10.8	5.1	4.6	6.4
Fertilizer and fertilizer materials	5.2	5.5	5.0	9.9	8.6	8.7
Vegetable Oils and fats, inedible	5.1	4.1	7.2	5.0	7.2	6.8

brings tank-car prices down to 17¢ (delivered in the East)—was first announced by Du Pont.

Du Pont and Shawinigan, pioneers in the acetate field, still manage to supply the major portion of business, but increasing production from newcomers over the past couple of years has steadily pressured the emulsion prices. Reductions, including the latest, actually add up to a near-20% off the price of two years ago.

Down too, by 1½¢/lb., are official schedules on acetone. The emphasis here, of course, is on the term "official." For despite major sellers' heated denunciations of price-cutting tactics, fact is that the new 7¢ figure (in tanks) has a familiar ring to customers in a number of local areas.

Under-the-counter maneuvering has long been a factor that's kept the acetone market seething; it has pressured manufacturers' prices down a full 11½¢/lb. in less than a year.

It seems fairly certain, however, that the newly posted tag will eliminate any further price concessions—profit margins are shaved mighty thin at that level.

That very reason—price too low to match production and handling costs—is driving Eastern formaldehyde prices up again from the \$3/cwt. (methanol-free, tanks) set in late December.

The advance (50¢/cwt.), as well as increases in inhibited material, was initiated by Celanese late last week. Indications were (*CW Market Letter*, Feb. 19) that formaldehyde would likely be hiked by the second quarter. Since all producers are faced with the same costs problem, the new prices will probably become industry standards. (Celanese also boosted its flake paraformaldehyde prices, which were cut a few months ago.)

Though no change was made in formaldehyde prices to Western markets, the Zone 1 (East) alterations do whittle the controversial East-West differentials (*CW Market Letter*, Jan. 1).

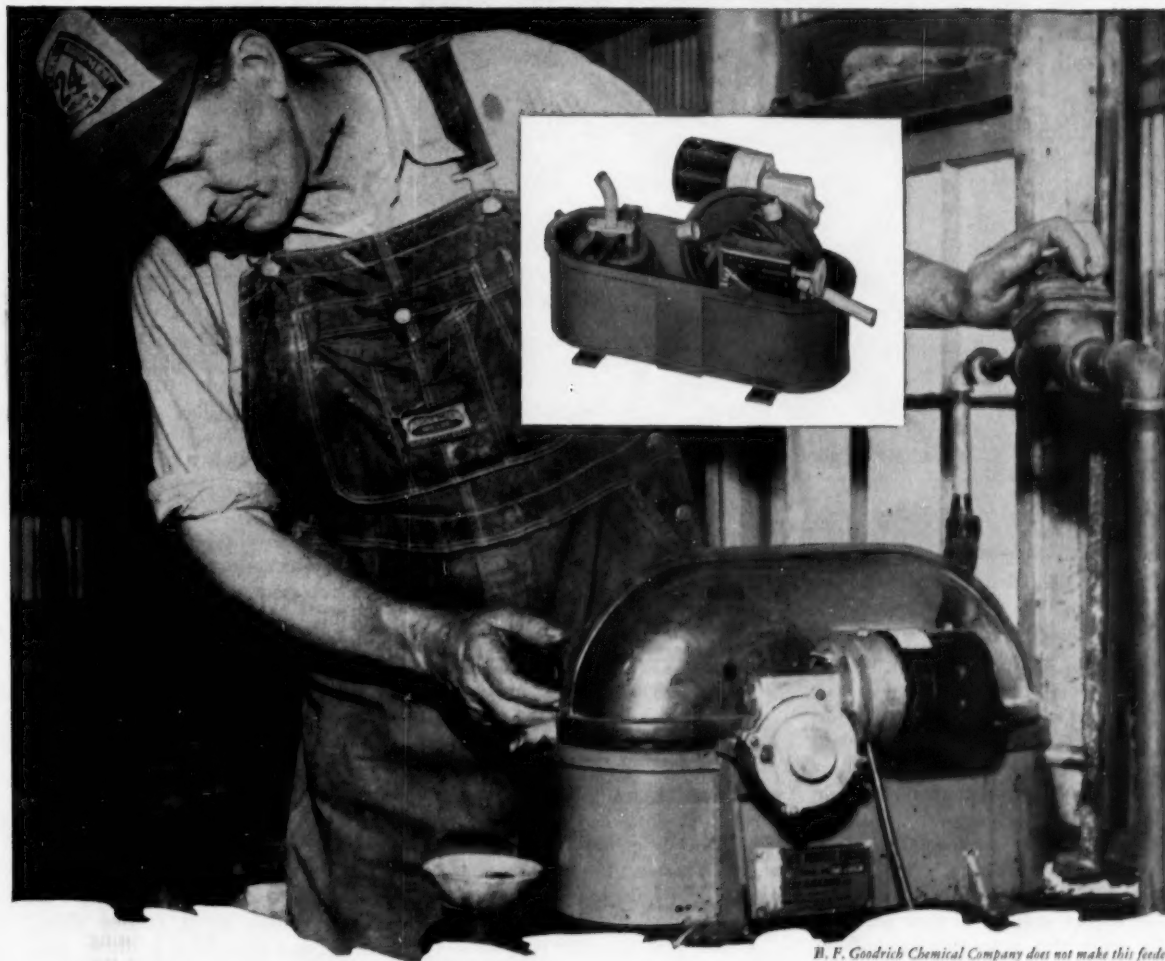
## SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending February 28, 1955

UP					
	Change	New Price		Change	New Price
Formaldehyde (methanol-free), tanks, dlvd. East	\$ .005	\$ .035	Paraformaldehyde, 91%, flake, bgs., c.l., frt. alld.	.0085	.105
Iodine, resublimed, USP, jars, dms.	.25	2.55			
DOWN					
Acetone, CP, tanks, dlvd.	\$ .005	\$ .07	Toluol, coal tar, industrial or nitration, Ohio districts, tanks, works, gal.	.005	.32

All prices per pound unless quantity is stated.

**Another new development using**

# **B. F. Goodrich Chemical** *raw materials*



*B. F. Goodrich Chemical Company does not make this feeder. We supply only the Geon resin for the rigid vinyl plastic.*

## **All rigid vinyl feeder handles sulfuric acid 24 hrs. a day**

**T**HE feeder shown here supplies a steady flow of concentrated sulfuric acid to a production process. It is in use 24 hours a day, 7 days a week, yet has required no maintenance or repairs after more than 6 months of this severe service.

This marvelous record of trouble-free operation is due to the outstanding corrosion resistance of Geon rigid vinyl from which all parts of the feeder, except the motor, are made. Similar feeders made from other materials frequently broke down in service causing production delays and creating hazards to operating personnel.

This success story of Geon rigid vinyl is one of many in which this unique material is setting new records in industry for handling corrosive materials. Furthermore, Geon rigid vinyl is tough, strong and has excellent electrical properties.

This all rigid vinyl feeder may give you an idea for an equally successful application. There are scores of uses for Geon vinyl materials—from rigid sheets and panels to flexible upholstery, wire insulation, vinyl sponge and many more. Helpful technical information is yours

for the asking. Please write Dept. K-3, B. F. Goodrich Chemical Company, Rose Bldg., Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ont.



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WORLD'S LARGEST bastnaesite ore deposits may assure U.S. . . .

## No Scarcity of Rare Earths

A profit-provoked interest in rare earths\* is growing at a feverish rate among chemical marketers, investors, and would-be speculators. Reason: any day several steel companies may switch from small-lot experimental usage to large regular purchases of the RE oxides chiefly to improve hot workability and impact strength of their products. To meet this potential demand by steelmakers and other RE users (as well as boosting U. S. supply of thorium) new RE sources are being developed apace. This year, the Office of Defense Mobilization's goal for REs is 14 million lbs. containing 50% oxides. Some recent developments, however, indicate that ODM's target will be overshot:

- Mallinckrodt Chemical broke the news last week that it was taking heavy euxenite concentrates (containing niobates and titanates of several REs, uranium, thorium, etc.) from the Porter Bros. Mining Co.; the latter has begun processing ore in Bear Valley, Idaho.

\* The "rare earth" elements are actually metals, were called "earths" because they were first known as oxides. Designated as elements 57 to 71, the group accounts for about 0.00005 part of the earth's crust. Reason for the group's chemical similarities: each has three electrons in the outer atomic orbit; variations among the REs occur in an inner orbit (4f), can play little part in RE chemical activity.

- Later this year Marine Minerals, Inc. (near Aiken, S. C.) will reach full production of thorium-bearing monazite concentrates.

- When the Crane Co. begins processing an estimated 6000 tons/year of ilmenite for titanium this year, it may make available a tidy amount of RE oxides found in monazite sands.

- This year monazite supplies from So. Africa are expected to exceed last year's imports. (Requirements of principal U. S. RE producer, Lindsay Chemical Co. (West Chicago, Ill.), are now met almost entirely by these imports.)

U.S. imports of monazite received a sharp setback when Brazil, in 1946, and India, the following year, placed embargoes (except for certain purchases by the U.S. government) on shipments of the sands or the concentrates of the mineral when it became known that thorium is a strategic fissionable material.

**Bastnaesite Bounty:** None of these sources, however, comes near matching the size of the RE beds discovered a few years ago near the Mojave Desert in California. Added attraction: the vast lode of bastnaesite (essentially

† Other major U.S. producers include Rare Earths, Inc. (Paterson, N. J.) and Maywood Chemical Works (Maywood, N. J.).

## MARKETS . . . . .

a fluorocarbonate of cerium, lanthanum, and dysprosium) contains no fissionable materials.

The Molybdenum Corp. of America, already looking for RE supplies, moved quickly to acquire these California deposits of bastnaesite, the world's largest known RE reservoir (*see cut*). One objective is to develop the use of calcined bastnaesite for the steel industry, much as have been ferroalloys of molybdenum, vanadium, columbium, etc.

Molybdenum Corp. avers that today it can, by an intricate flotation process, process enough bastnaesite ore at Mountain Pass to yield 10 million lbs./year of high-grade RE oxides—an amount that banishes any doubt of U. S. self-sufficiency.

By contrast with the bastnaesite flotation, the monazite concentration requires a chemical process. Moreover, the percentage of REs in bastnaesite ore is much higher than in monazite sands. Concentrates from both minerals, though, contain about 50% cerium as the oxide and the chloride.

Although sellers of calcined bastnaesite maintain that their RE oxides are almost as pure as those derived by chemical means from monazite, the slight impurities have caused some steelmakers to hesitate using the bastnaesite, pending further tests.

Adding purer rare earths means more profit to steel manufacturers. For instance, misch metal (cerium, lanthanum, and other REs) additions can transform high-alloyed, inherently hot-short, austenitic stainless steels into ductile alloys; can improve hot workability and increase yields of inherently ductile low-alloy austenitic stainless steels. RE oxide additions can increase billet yields (at less cost than the misch metal) of ductile austenitic stainless steels (AISI types 308, 310, 316, etc.). But it appears that misch metal addi-

### Rare Earths Use 1955 (est.)

Optical glass polishing	30-35%
Glass manufacturing	10-15%
Lighter flints	10%
Carbon arc cores, steel additive, special alloys, misc.	30-40%
Export	10-15%



# SPECIAL PROFIT AND SUPPLY ADVANTAGES FOR CHEMICAL PROCESSORS



Michigan Chemical Corporation has twenty years' experience in the research and production of Bromine, Magnesia, Chloride, and Calcium chemicals. This background provides users with a dependable source of quality chemicals made right and priced right; our plants are large enough to provide quantity shipments for practically all purposes. Insure continuity of your operations: order from Michigan Chemical.

On requirements for special products (i.e., intermediates) consider us. We can move fast, efficiently, and price-competitively on your needs.

**Aluminum Bromide Anhydrous.** Technical grade, dark colored product suitable for most manufacturing uses. Highly reactive catalyst, many uses in organic synthesis especially in isomerization, bromination and halogen exchange reactions. Available as solid or lump.

**Ammonium Bromide NF IX.** A white powder, very pure, complies with all the requirements of the National Formulary. Commonly used as sedative in pharmaceutical preparations. Also in photography, textile finishing and as fire retardant for fabrics.

**Bromine, Dry.** A powerful oxidizing and brominating agent used in manufacture of dyes, pharmaceuticals. Many applications in organic synthesis. Low moisture content of 30 ppm permits use in nickel and monel equipment. Very irritating to skin, eyes.

**Bromodichloromethane.** A clear, heavy, volatile liquid with a chloroform-like odor. Specific gravity 1.99; boiling point 90 degrees C. Soluble or miscible with many organic liquids. Used in organic synthesis. Adds to olefins under the influence of peroxide catalysts.

**Bromotrichloromethane.** A clear, colorless, heavy liquid with a chloroform-like odor. Specific gravity 2.0; boiling point 104 degrees C. Miscible with many organic liquids. Useful in organic synthesis, forming adducts with olefins with peroxide catalysts.

**Chlorobromomethane "CB".** A specially prepared pure, non-corrosive fire extinguishing fluid. Now finding increased use in factories, warehouses, homes. Clear, colorless, 2 degrees C. boiling range; complies with current military specifications. Used as solvent and in organic synthesis.

**Cyclopentyl Bromide.** A clear, colorless liquid with an aromatic odor. Specially prepared for use in organic synthesis, particularly for introduction of the cyclopentyl radical. Many potential uses in manufacture of pharmaceuticals. Purified grade, 2 degrees C. boiling range.

**Dibromochloromethane.** A clear, colorless, heavy liquid similar to bromodichloromethane. Used in organic synthesis, forming adducts with olefins under the influence of peroxide catalysts. Specific gravity 2.38; boiling point 116 degrees C.

**$\beta$ -Diethylaminoethyl Chloride Hydrochloride.**  $(CH_3CH_2)_2NCH_2CH_2Cl \cdot HCl$  (DEC). A granular solid. Specially suited for use as an intermediate in organic chemical manufacture, including antispasmodic agents and other pharmaceuticals.

**$\beta$ -Dimethylaminoethyl Chloride Hydrochloride.** (DMC).  $(CH_3)_2NCH_2CH_2Cl \cdot HCl$ . A granular solid. Specially prepared for use in manufacture of antihistaminics and other pharmaceuticals. Other potential uses in organic synthesis. Relatively non-toxic in hydrochloride form.

**$\beta$ -Dimethylaminoisopropyl Chloride Hydrochloride.**  $(CH_3)_2NCH_2CH(CH_3)Cl \cdot HCl$  (DMIC). An organic intermediate similar in appearance and properties to DEC and DMC. Specially prepared for manufacture of analgesics and other pharmaceuticals. Other potential uses in organic synthesis.

**$\gamma$ -Dimethylaminopropyl Chloride Hydrochloride.**  $(CH_3)_2NCH_2CH_2CH_2Cl \cdot HCl$  (DMPC). A white powder of singular purity. A versatile intermediate for pharmaceutical and organic syntheses, available exclusively from Michigan Chemical.

**Ethyl Bromide.** A clear, colorless, volatile liquid, specially prepared for use as an intermediate in organic synthesis. Practically free from impurities; has a narrow boiling range. Used in manufacture of dyes, perfumes and pharmaceuticals.

**Hydrobromic Acid.** A clear, colorless or light amber colored fuming liquid. Used for manufacture of inorganic metal bromides, aliphatic bromides, pharmaceuticals, dyes and intermediates. 48% acid and other strengths.

**Magnesium Carbonate, Basic, Technical.** Fine, uniform white powder, 325 mesh, bulk density 5.5 pounds per cubic foot. Very reactive. Used for rubber compounding, printing inks, paints, varnishes. Anti-caking agent for table salt; conditioning or bulking material for powder formulations.

**Magnesium Hydroxide.** Fine, white powder, typical assay 96.3%, low in moisture, iron, alumina, silica. Technical and NF IX grades. Special bulk densities available in NF grade. Convenient material for manufacture of light magnesia, other magnesium compounds.

**Magnesium Oxides.** Six principal grades of Michigan magnesium oxide with wide range of desirable physical and chemical characteristics covering principal uses of  $MgO$ , including rubber compounding, rayon manufacture, ceramics, glass, refractories, insulation.

**Methyl Bromide.** A heavy, colorless liquid, vaporizing at 40 degrees F., non-flammable and poisonous. Highly penetrating and insecticidally effective fumigant. Also used in organic synthesis for the introduction of the methyl group, especially in preparation of certain pharmaceutical chemicals.

**Methylene Bromide.** A clear, colorless liquid. Miscible with methyl alcohol, ether, chloroform and other organic liquids. A purified product with a 1.8 degrees C. boiling range. Specific gravity 2.47. Used in organic synthesis, as solvent and heavy gauge liquid.

**Monobromobenzene.** Clear, colorless, heavy liquid. Specially prepared for use as an intermediate in preparation of organic compounds. For introduction of the phenyl radical and in Grignard-type reactions. A pure material with a 4 degrees C. boiling range; specific gravity 1.495.

**Phosphorous Tribromide.** Brominating agent. A liquid, boiling point 173 degrees C., which fumes in contact with moist air. Used in synthetic work to convert alcohols to bromides, and acids to acyl bromides. Specially useful in preparation of bromides from alcohols without rearrangement.

**Potassium Bromate, Granular.** A fine, white, granular or crystalline material 99.5% pure. Decomposes at 370 degrees C. with evolution of oxygen. Strong oxidizing agent, used as an analytical reagent. Neutralizer in permanent wave compounds.

**Potassium Bromate, Powder.** A fine uniform powder with same properties as Granular. Available with added magnesium carbonate conditioning agent when specified. Suitable for use as an aging additive for flour.

**Potassium Bromide, U.S.P. XIV.** Pure, white granular powder. Low in chloride, passes all U.S.P. requirements. Widely used in the preparation of photographic emulsions, and in lithography. One of the most important sedatives. Available in several granulations.

**Sodium Bromide, U.S.P. XIV.** Pure, white crystalline powder or granules. Passes all requirements of the U.S. Pharmacopoeia. High assay; low in chloride. An important nerve sedative. Used in manufacture of other bromides. Contains about 77.5% bromine.

**Trimethylene Chlorobromide.** Clear, colorless liquid used in manufacture of anesthetic grade cyclopropane. Greater reactivity of bromine atom makes trimethylene chlorobromide specially useful also in preparation of gamma chloro compounds. Boiling range 2 degrees C. maximum.

**Zinc Bromide Solution, Optical Grade.** Clear, colorless solution, about 80%  $ZnBr_2$ . Used in laboratories dealing with radioactive chemicals as a radiation viewing shield; the most satisfactory material. Meets all chemical and optical specifications of Argonne National Laboratory.

Also manufacturer of Pestmaster\* Insecticides, Pestmaster\* Methyl Bromide Fumigant and Dustmaster\* Road Chemicals.



\*\*Trademark

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## MICHIGAN CHEMICAL CORPORATION

302 Bankson St., Saint Louis, Missouri

EASTERN SALES OFFICE: 230 Park Avenue, New York 17, New York

BASIC MANUFACTURER OF INDUSTRIAL, PHARMACEUTICAL AND AGRICULTURAL CHEMICALS

March 5, 1955 • Chemical Week

67

tions, rather than oxides, lead to improvements in the hot workability of hot-short stainless grades.

REs, too, are used in the making of nodular gray cast iron, and, by at least one Midwestern steel mill, in medium carbon steels.

**More Than Steel:** Although current interest is focussed on steel usage, that industry's present rate of RE consumption is exceeded by each of two other users: polishers of optical glass and manufacturers of carbon arc cores.

Figures on the amount going into carbon arc cores are kept under lock, since Lindsay Chemical supplies most of the REs. (The RE oxides and fluorides impart a higher luminosity to the cores than do other metallic salts or oxides.) Output of the cores is growing to keep up with the demand by movie drive-ins and by television studios.

Despite this secrecy, a fair estimate of RE usage would rank present steel additions and carbon core demand about 30-40% of the total market. Included in the miscellaneous category (*see box*) would be an unknown amount of cerium going into magnesium-zirconium-cerium alloys for jet engine and gas turbine parts.

Top specific use—about one third—of RE oxides is in the polishing of optical glass. Glass manufacturers say that if current RE oxide prices were halved, they would use them in larger volume to polish plate, flat, and windshield glass. Reason: the oxides do the job twice as fast as rouge.

Glass colorers, too, use certain RE compounds—those of neodymium, praseodymium, and samarium. This outlet has diminished since the '30s with the decline in popularity of colored glass.

As misch metal the REs have been in lighter flints since the turn of the century. At the beginning of World War II these flints took an estimated 40% of REs; today other end uses have cut this percentage to about 10%.

Despite these varied outlets, a bulk-supply of RE raw material will continue to grow, but only as the government continues to flash the green light for monazite concentrates in the defense build-up of thorium.

This government-induced pileup is behind today's buyers' market for RE oxides in the U. S. It's one reason, too, why current producers are understandably mum on sales-developing

plans. At the present time, it's the practice of rare earth companies not to sign long contracts. They don't know what price they should charge for their RE products. And the reasons are easy to find: uncertainty on stock-piling and in new outlets for the RE oxides.

But this much is certain: though rare earth supplies may outrun demand for some time, the present heated interest from myriad potential users may move up the day of market balancing sooner than many expect.

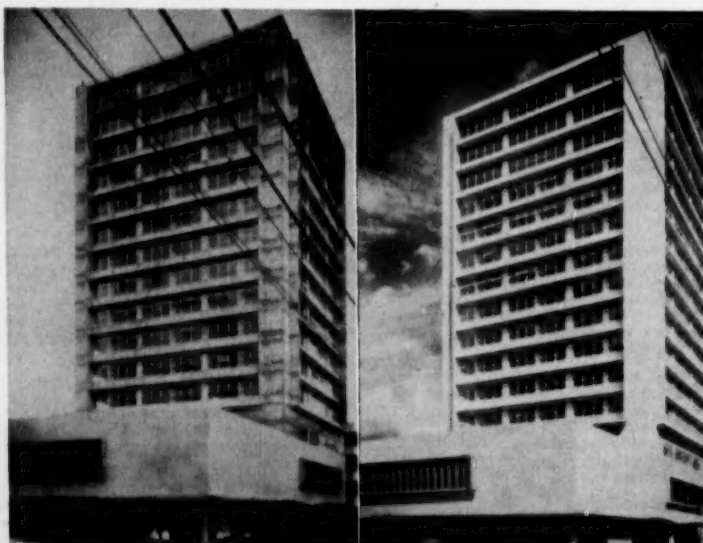
## Steady for Stores

Though gum rosin sales at the moment are slow, and turpentine shows no immediate tendency to gallop, there's more than a modicum of optimism surrounding the outlook for

the naval stores market in general. Reason: the season. This month, for example, rosin export activity usually picks up; and March marks the traditional tailend of the season when exporters' stocks are down.

Total production of rosin and turpentine this past year seems to be matching the previous season. Last week the Crop Reporting Board released its latest tally (for January), which indicates that during the month some 4960 bbls. of turpentine and 17,700 drums of rosin were turned out. This brought output for the season through Jan. 31, to 166,500 bbls. of the former, 499,520 drums of the latter—close to last year's figures.

Commodity Credit Corp. holdings on that date accounted for 57,470 bbls. of gum turpentine, 672,120 drums of gum rosin.



## Plastic Skin—Before, After

POLYVINYL ACETATE copolymers with vinyl chloride have become familiar to the consuming public in such forms as aprons, shower curtains, shoes, film for protective garments, packaging. But now, when shoppers in Tyler, Tex., glance up at the new 15-story Carleton Hotel, they're looking at the first use of the material sprayed on as a veneer enclosing an entire

building. Some 1400 gal. of the liquid plastic were sprayed directly on 40,000 sq. ft. of reinforced concrete to form a continuous, jointless sheeting. Time: 6 weeks; cost 40¢/sq. ft.

Use of Liquid Plastics Corp.'s Plastispray eliminates all flashing, coping, facia and caulking; it may well offer keen competition to brick veneer or aluminum sheeting.



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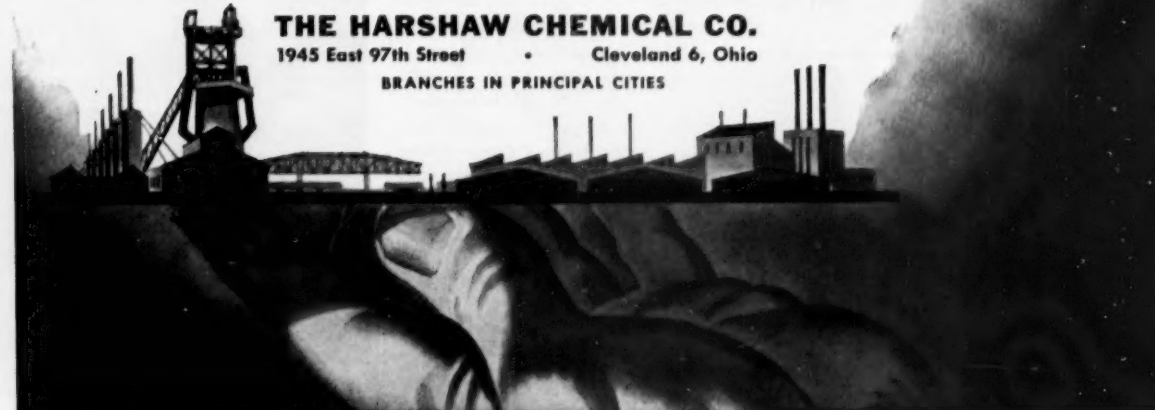
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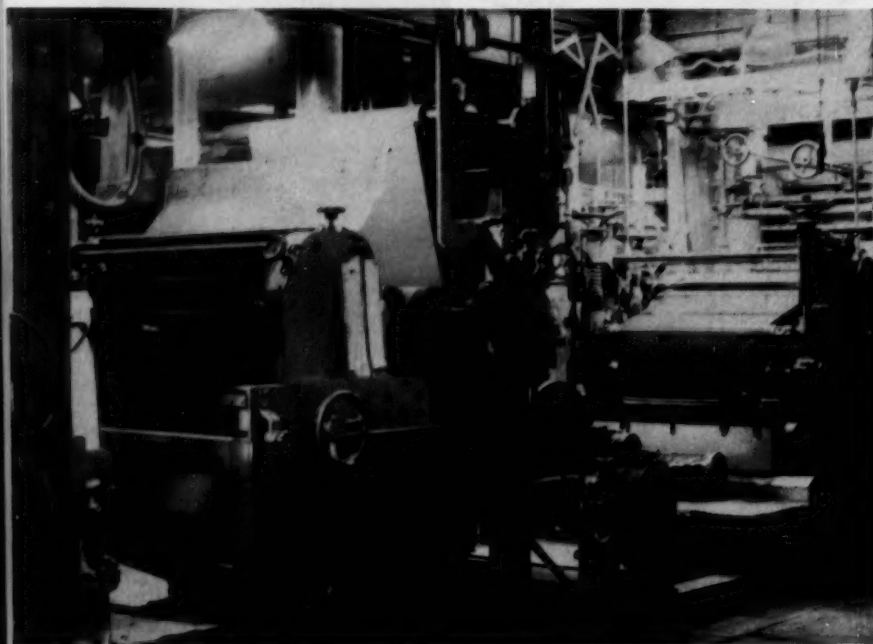
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# SPECIALTIES . . . . .



GLUE AND ABRASIVE coat \$100-million web of 'sandpaper' at 350-ft./minute rate. CARBORUNDUM CO.

## Fight in Grit and Glue

A double battle, between natural and synthetic adhesives, and between natural and synthetic abrasives, livens the manufacture of coated abrasive products.\*

Substantial markets are at stake—valued at about \$6 million for glues, and \$5 million for grains.

Give the average man a sheet of sandpaper—and he'll likely bark his knuckles. And it's over sandpaper (to use an outdated term for the abrasive-coated cloth, fiber and paper used for grinding and polishing) that some of the roughest knuckle-busting is now taking place in the glue and abrasive industries.

For with the booming use of coated abrasives—such products have a market value now of about \$100 million annually—has come a real struggle among the suppliers of specialty adhesives, and producers of various types of grinding compounds. In both cases, it is largely a battle between synthetic and naturally derived products.

The market they're battling for is a lush one, so lush that few coated abrasives makers will talk about it. But estimates from several other sources run like this: adhesive needs are about 15 million lbs./year; abra-

sive demands, approximately 20,000 tons/year.

**Natural Sticker:** Long the dominant adhesive in coated abrasive manufacture has been animal glue. Now, beset by foreign competition that has forced two price cuts (in lower grades) in the past year, the glue makers [including Consolidated Chemical Industries (Woburn, Mass.); Peter Cooper Corps. (Gowanda, N.Y.); Delany & Co. (Philadelphia); F. W. Tunnell & Co. (Philadelphia); and Milligan & Higgins Corp. (New York)] have surrendered an estimated 30-35% of the market to synthetic resins.

Because natural products are still favored by many abrasive coaters†—

\* The trade term for paper, fiber and cloth coated with such abrasives as silicon carbide, aluminum oxide, garnet, emery, flint.

† Top four coated abrasives makers are Armour & Co., Behr-Manning Corp., (affiliate of Norton Co.), Carborundum Co., Minnesota Mining & Manufacturing Co.

they are old, familiar products, inexpensive and suited for most uses—this shift has been gradual. It has top glue makers seriously concerned, however—there are few major suppliers of animal glues that also have extensive interest in synthetic bonders.

Synthetic adhesives have stepped into favor like this: manufacture of sandpaper requires three glue applications—a sizing coat on the backing (generally cloth or fiber, although heavy kraft paper in several grades is used), a "making" coat on which the abrasive grain is applied, and a final sealer coat to anchor the grains. Synthetics were first used extensively on the sealer coat, in combination with the naturals. More recently they have taken over in the "making" coat.

The result has been that natural glue makers currently are overstocked, and some have halted manufacture temporarily (sandpaper makers have been one of the top three glue customers for years).

**Rougher Use:** Because they can withstand heat better, are waterproof, and can be formulated by the coater, some synthetic resin adhesives have become particularly valuable for products such as sanding discs. On the other hand, use of the synthetics requires some additional equipment (heating units) to make the bond. Too, they sometimes lack the flexibility of animal glues. As a result, although firms like Reichhold and Durez have a substantial interest in adhesives for coated abrasives, the volume—as yet—



QUICK GAUGE: Beta gauge keeps continuous check on abrasive, glue thickness. CARBORUNDUM CO.

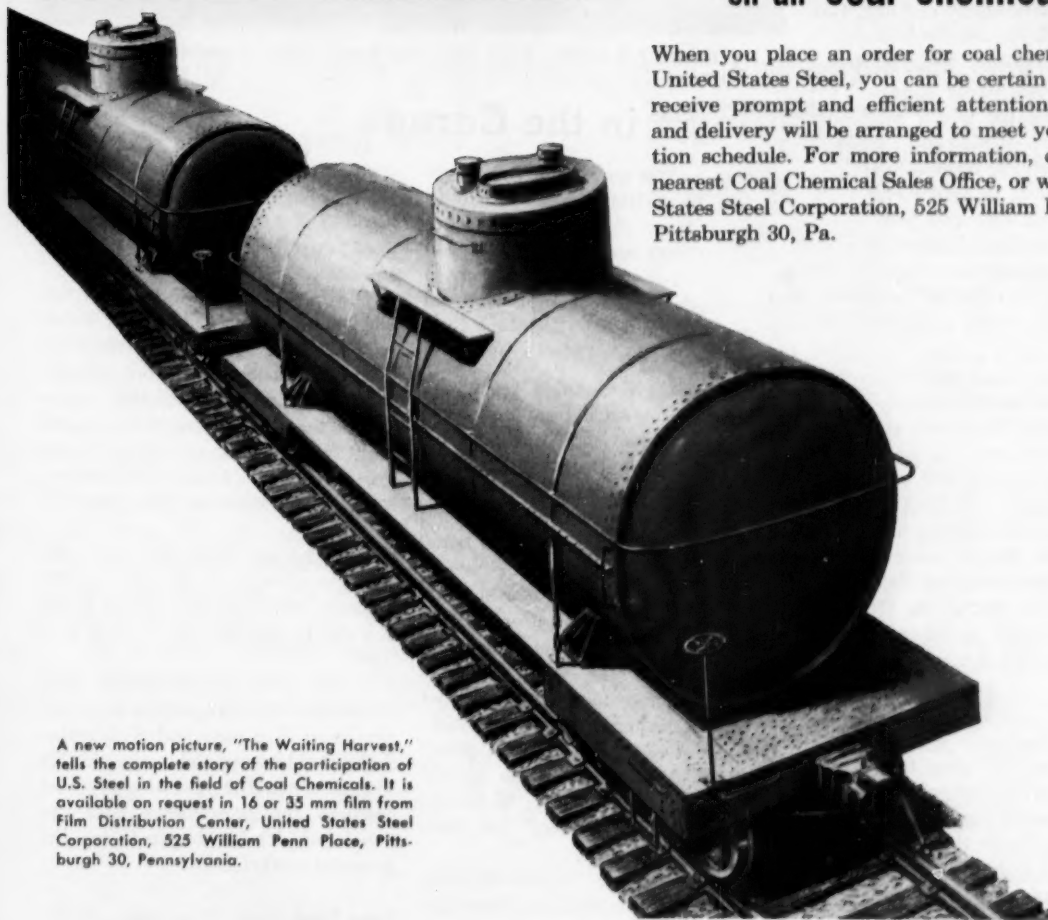


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## USS Coal Chemicals



UNITED STATES STEEL

is far from being as robust as they would like.

**Starting from Scratch:** Although electro-furnace abrasives have been available for years (silicon carbide since about 1900, aluminum oxide since about 1914), and abrasive paper use has pretty well stabilized, there has been at least one change in the past few years: the natural material, garnet (produced only by Barton Mines Corp.), is now processed to make it more competitive with aluminum oxide (for woodworking).

In the past few years garnet has managed to improve its market position. Current estimates are that about 15-20% of the grain is garnet; aluminum oxide and silicon carbide split about 75-80% of the market, and the natural products, emery and flint, take the rest (with flint on the bottom).

**Versatility Helps:** The synthetics have, of course, vastly increased the range of jobs for which sandpaper is used. Silicon carbide and aluminum oxide have actually created the role of coated abrasives in most metal-working jobs. And synthetic resin glues have made sanding discs much more durable—a disc for floor sanding, for example, can run "hotter" with resin bonding, and outlast a natural-glued disc.

There have been numerous other refinements in coated abrasive manufacture, besides improved specialties like glues and grits. Techniques for speeding up drying are typical—for years, the ribbon of sandpaper was festooned in special drying areas, then aged in rolls. Special processing has eliminated festooning in the newest plants, such as Minnesota Mining & Mfg.'s \$3-million facilities in Minneapolis, opened just a month or so ago.

Abrasive preparation, too, has changed. Aluminum oxide, for example, is "etched" after it has been pulverized, so that adhesives grip better. In the newer plants, also, the grit is not dropped onto the speeding web of backing—it is drawn up to the glued underside of the web by static electricity. More and sharper "points up" cutting edges result.

Indirectly such refinements have lifted demand for both glues and grits—with synthetic products favored. Their market seems assured. As one resin maker says, "Currently, we've hardly scratched the surface."



CARPET LAYING: Floor protection from a coat of peelable vinyl.

## Vinyls in the Garage

Garage owners and filling station operators have lately been thanking—with continued and boosted purchases—a California specialties maker that has tailored a vinyl paint precisely to their needs. The company is National Vinyl Products Co.\* (Redwood City, Calif.); its product, Drip Carpet.

Drip Carpet is designed to protect concrete garage floors from grease and oil drippings. Not only does it form a film impervious to these hydrocarbons, but it also gives a surface from which they can easily be removed. National is currently pushing it for both home and commercial application.

National introduced its novel product last June, so far sells it only in the Oregon-Nevada-California area. But with Bakelite (the vinyl supplier) giving it a promotional boost, it hopes to attain countrywide distribution. Drip Carpet's volume is still pretty small—1500 gal./year is the current pace (prices: \$10.95/gal.; \$2.95/qt.; \$1.75/pt.), but National has been moving slowly so far.

**Patio to Garage:** When originally formulated and introduced, Drip Carpet was suggested for painting patio floors and other concrete surfaces. The formulation was offered in many colors, was somewhat thinner than the

current one. Initial success with the garage owners, however, decided National to offer only two colors (red and gray), in a thicker, more wear-resistant paint.

The formulation now includes two vinyl resins, three plasticizers (such as TCP, DOP, R2H), and vinyl-dispersed pigments in a ketone solvent. It is brush applied, preferably over a surface that has been carefully cleaned with lacquer thinner. Drip Carpet dries to the touch in about 10 minutes, leaving a nonporous film of vinyl chloride.

The film can be peeled from the concrete when it is damaged or extensively soiled. Small ruptures in the film can be patched by painting over them.

So far, Drip Carpet has its field almost to itself. Competitive items are aluminum drip pans and such makeshifts as old corrugated cardboard. It's a case where the specialty provides neatness and convenience—and National feels it's just begun to tap the potential market.

**Long-Time Kick:** To maintain the insecticidal qualities of pyrethrum over a long period, the Société Coloniale de Pharmacie et de Droguerie is using sodium bisulfite and trioxymethylene. By means of its patented process (Brit. Pat. 699,007, calling for a substance releasing formaldehyde and a

\* Pacific Compounding & Packaging Co. is currently making Drip Carpet for National. PCP also makes a number of vinyl paints including A-Feeling Paint (CW, Nov. 27, '54, p. 58).



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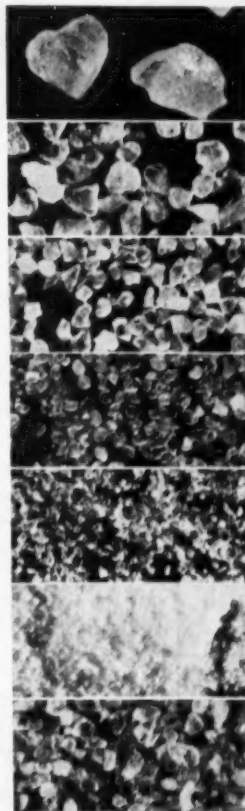
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## SPECIALTIES . . . .

salt of an oxyacid), 700 grams of a 1:2 mixture of the two compounds held the loss of effectiveness of one ton of pyrethrum to 5% over a seven-month period. Ordinarily, loss would be 20%.

**Glue Pair:** North American Aviation, Inc. (Downey, Calif.) is now producing a pair of specially modified phenolic adhesives said to be suitable for high-temperature and -humidity environments:

- NAA Hi-Temp is suggested for bonding metals and reinforced plastics.
- CHT is used for fabrication of heat-resistant "sandwich constructions."

**Longer Snap:** To keep light-colored rubber goods elastic and free from discoloration, American Cyanamid is now in production of its Antioxidant 425. Chemically, the antioxidant is 2,2'-methylene bis (4-ethyl-6-tertiary butyl phenol), and inclusion of 0.5-1.5% is suggested for protection against heat, light and oxygen aging effects.

**Paint Twists:** A couple of new products in the coatings field:

- The Building Products Division of L. Sonneborn Sons, Inc. (New York) is now selling Hydrocide Colorcoat, a water-repellant surfacer for all sorts of building materials (concrete and cinder blocks, wood, asbestos shingles). Described as having an oil base with silicone compounds, it is claimed to finish and seal in one coat.
- Aluminum Co. of America (Pittsburgh) now markets an aluminum flake pigment especially developed for caulking. Typical home use formulation is Gibson-Homans Co.'s (Cleveland) Aluminum Handi-Calk, which is suggested for "puttying" aluminum storm sash and windows.

**Herbicide Duo:** Two new weed and grass killers are currently in the news:

- Geigy 444 is a herbicide for cotton. Chemically 2-chloro-4,6-bis(diethylamine)-s-triazine, it appears to control broadleaved weeds and annual grasses when applied both as a pre-emergence and postemergence weed killer. Still being tested, it shows promising results with lima beans and peas, too.

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killer developed for industry by Pacific Coast Borax Co. (Los Angeles). Sold dry and ready to apply, it is made with a complex of sodium borates and 3-*p*-chlorophenyl-1,1-dimethylurea.

## Try This for Size

Hercules Powder Co. last week peeled the wrapper off its newest paper chemical: a sizing, called Aquapel 380, which reacts with the cellulose fibers of the paper.

Climaxing a four years' search for a size that would be superior to rosin or alum, Hercules finally hit upon the alkylketene dimer that it feels does

the trick. Some of the highly touted features:

- It can be applied in alkaline solutions (unlike rosin or alum); is unaffected by alkaline adhesives.
- It can be applied in standard equipment.
- It is used in very small quantity (2-6 lbs./ton).
- It imparts repellency to hot and cold water (it is not a waterproofer, nor does it give wet strength).

Hercules sees its Aquapel 380 as the first of a series of alkylketenes that can be used with cellulose products. Priced now at \$1.35/lb., it will be manufactured in Hercules' Milwaukee plant.

## Knowledge Swap

The ink's hardly dry on the ad copy announcing new liquid-lead pencils (CW, Feb. 26, p. 74) when Scripto and Parker decide to interlicense processes and tradenames.

Under the agreement, the firms will exchange formulas, and both will sell products called "Liquid Lead." Scripto will drop its Fluidlead tradename, partly to capitalize on the extensive publicity Parker will give Liquid Lead. The firms will continue making their own products for their own use; Scripto will likely concentrate on the low-priced field, Parker on the higher-priced lines.

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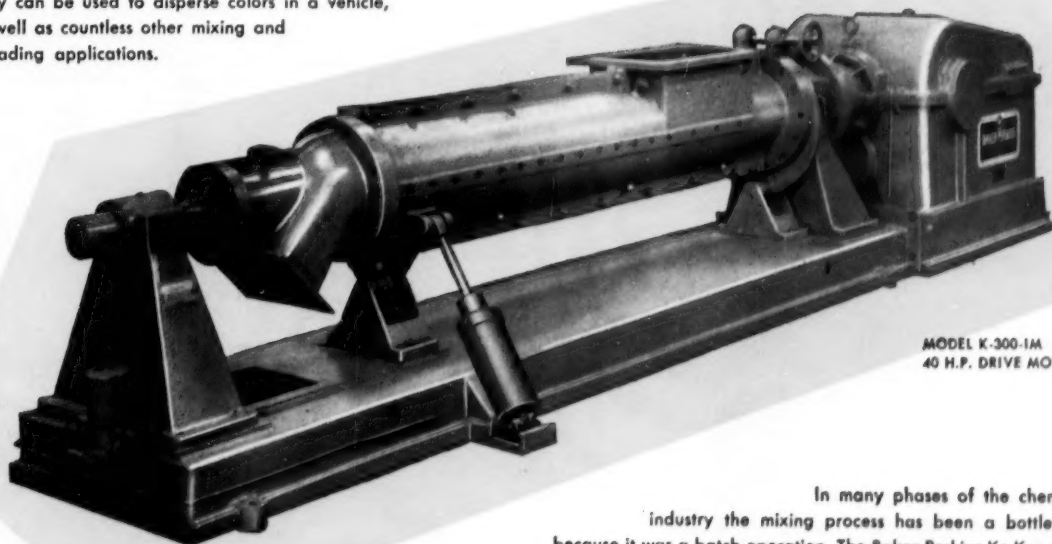
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# Two more BAKER PERKINS continuous-mixing KO-KNEADERS (LIST SYSTEM) now on the job



MODEL K-400-1M  
30 H.P. DRIVE MOTOR

A switch from the batch process to continuous is now possible in many mixing, blending, and kneading operations, by use of these new Baker Perkins Ko-Kneaders. The two models shown here are both for Kneading heavy masses . . . chemicals, margarine, soaps, rubber, and plastics such as polystyrene, PVC, polyethylene, or acetate. They can be used to disperse colors in a vehicle, as well as countless other mixing and kneading applications.



MODEL K-300-1M  
40 H.P. DRIVE MOTOR

In many phases of the chemical industry the mixing process has been a bottleneck because it was a batch operation. The Baker Perkins Ko-Kneaders break this bottleneck by converting to continuous mixing. When installed with the proper feeding and output handling equipment, these Ko-Kneaders make mixing largely automatic, and result in a better quality product along with savings in production costs.

## BAKER PERKINS INC.

CHEMICAL MACHINERY DIVISION • SAGINAW, MICHIGAN



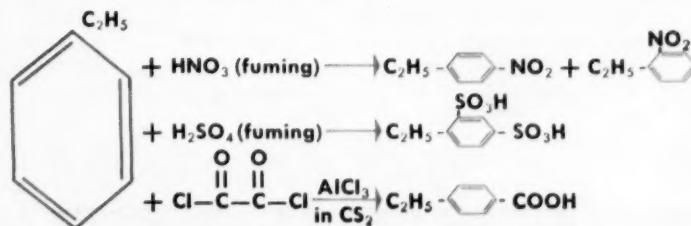
the decision is for

# CARBIDE'S ETHYL BENZENE

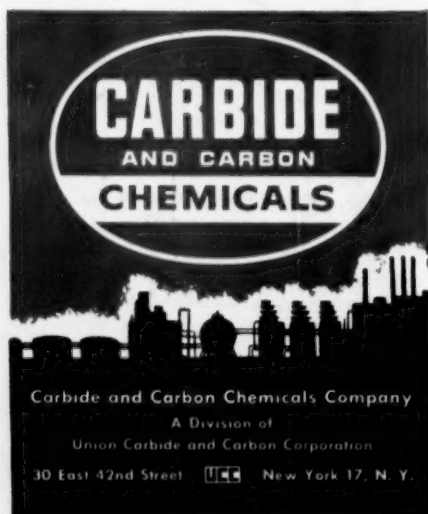
You'll agree when you look at the evidence. Here are the facts on CARBIDE's ethyl benzene—it has many uses, one of which may fit your needs.

## 1. INTERMEDIATE:

Many important drugs and chemicals are made using ethyl benzene as a starting material. Look at these typical reactions—they may apply to your present process, or they may suggest a new synthesis.



In Canada:  
Carbide Chemicals Company,  
Division of Union Carbide Canada  
Limited, Toronto.



## 2. SOLVENT:

Ethyl benzene is outstanding as a solvent for vinyl-type polymerizations. It is a chain-transfer agent and promotes the formation of low-molecular-weight polymers for use as adhesives, coatings, and viscosity index improvers for oils. Ethyl benzene is also a solvent for many waxes, oils, fats, and gums.

## 3. PURITY:

CARBIDE's ethyl benzene is exceptionally pure—this is assured by rigid specifications. Benzene content is less than 0.3 per cent by weight, and diethyl benzene content is not more than 0.17 per cent by weight.

## 4. AVAILABILITY:

Tank cars and drums of ethyl benzene are available for immediate shipment. Just call or write the CARBIDE office near you for further information or samples.